

PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 98, PHOTOGRAPHY.

PERIOD—A.D. 1877-83.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
BY DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1903.

PRICE ONE SHILLING.



PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 98, PHOTOGRAPHY.

PERIOD—A.D. 1877-83.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON W.C.

1903.

Digitized by the Internet Archive
in 2011 with funding from
Research Library, The Getty Research Institute

<http://www.archive.org/details/patentsabrigment03grea>

EXPLANATORY NOTE.

The contents of this Abridgment Class may be seen from its Subject-matter Index. For further information as to the classification of the subject-matter of inventions, reference should be made to the *Abridgment-Class and Index Key*, published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C., price 1s., postage 6d.

It should be borne in mind that the abridgments are merely intended to serve as guides to the Specifications, which must themselves be consulted for the details of any particular invention. Printed Specifications, price 8d., may be purchased at the Patent Office, or ordered by post, no additional charge being made for postage.

SUBJECT-MATTER INDEX.

Abridgments are printed in the chronological order of the Specifications to which they refer, and this index quotes only the year and number of each Specification.

Actinometers. *See* Photometers &c.

Cameras, Photographic. *See* Photography.

Camera stands. *See* Photography; Tripod and like stands.

ColloTYPE printing. *See* Printing, Photo mechanical.

Colouring photographs. *See* Photography.

Dark rooms, Photographic. *See* Photography.

Designs, Copying. *See* Photography.

Emulsions, Making.

Making emulsions for special purposes is indexed under separate headings, such as Cosmetics [Abridgment Class Toilet &c.]; Disinfectants &c., [Abridgment Class Medicine &c.]; Medicines &c., [Abridgment Class Medicine &c.]; Perfumery, [Abridgment Class Toilet &c.]; Photography; *for which see those headings.*

Enamels, Photographic. *See* Photography.

Films, Photographic and like. *See* Photography.

Lamps for photography. *See* Photography.

Magnesium lamps. *See* Photography.

Measuring intensity of light. *See* Photometers &c.

Mounting photographic prints and the like. *See* Photography.

Negatives, Photographic. *See* Photography.

Photograph albums. *See* Abridgment Class Books.

Photograph frames. *See* Abridgment Class Artists' instruments &c.

Photograph mounts. *See* Abridgment Class Artists' instruments &c.

Photographs, Displaying for sale or inspection.
See Abridgment Class Advertising &c.

Photograph stands and frames. *See Abridgment Class Furniture &c.*

Photography, [including processes of producing pictures resembling photographs by chemical reaction]:

actinometers. *See Photometers &c.*

aërostats, aëroplanes, and aërial machines for supporting apparatus. *See Abridgment Class Aëronautics.*

albumenized paper. *See printing below.*

automatic apparatus for taking and finishing photographs. '77. 1647. '78. 2746. '80. 1216. '81. 3366.

automatic shutters. *See shutters below.*

backgrounds. *See studio accessories below.*

body rests. *See studio accessories below.*

burnishing. *See finishing below.*

cameras—

attaching dark slides to. '77. 1647. '81. 4970. '83. 4732.

automatic. '80. 1216.

backs. '78. 1448. '81. 3014. 4823. '82. 3035. 3889. '83. 843. 4732.

baseboards and tailboards. '78. 1448.

change-boxes. *See change-boxes below.*

combined with—

change-boxes. '81. 4967. 5598. '83. 843.

dark rooms, developing-tents, changing-bags, and the like. '78. 3184. '81. 3628. '82. 3889.

developing trays and dishes. '82. 3889.

telescopes and opera and field glasses. '81. 775.

copying. '77. 1891. '79. 1073. '80. 1216.

dark slides. *See dark slides below.*

enlarging. '77. 329. 1891. '80. 2068.

finders. '80. 498.

focussing-devices. '77. 329. '78. 1448. 3465. '79. 4784. '80. 498. 1216. 2068. '81. 775. 3014. 4320. 4823. 4967. 4970. 5598. '82. 3268. 4671.

folding-up. *See packing &c. below.*

for producing photographs of special character. '77. 329. 3461. '80. 1216. '82. 4671.

fronts. '78. 1448. '80. 498. 3353.

hand. *See instantaneous below.*

instantaneous. '80. 498. '81. 775. 1559. 4320. 4823. 5598. '83. 843.

lens boards. '80. 3353.

lens fittings. *See lenses &c. below.*

magazine. *See instantaneous above.*

opera-glass form. '81. 775. 4823.

packing and folding-up. '77. 1647. '78. 1448. 3184. '80. 3353. '81. 4967. '82. 3035. '83. 4732.

pocket. '81. 4320.

reducing. '77. 329. 1891. '79. 1073. '80. 1216.

roller slides. *See roller slides below.*

screening lens. '77. 1891. '80. 1216.

shutters. *See shutters below.*

stand attachments. '82. 3268.

stands. *See camera stands &c. below.*

stereoscopic. '81. 775.

Photography—cont.

cameras—*cont.*

used also as—

magic-lanterns. '79. 1371.

telescopes and opera and field glasses. '81. 775.

camera stands or supports. '77. 329. 1891. '78. 3184. '82. 3491.

camera attachments. *See cameras above.*

tripod and like stands. *See Tripod and like stands.*

carriers. *See change-boxes; dark slides; below.*

ceramic photographs. *See enamels below.*

chairs. *See Abridgment Class Furniture &c.*

change-boxes. '80. 498. 1216. '81. 4320. 4323. 4823. 4967. 5598. '83. 843. 1007.

chemicals for use in, manufacture of. *See Abridgment Classes Acids, alkalies, &c.; Acids and salts, Organic, &c.*

chemicais, storing, conveying, and applying, [use not specified]. '78. 3184.

bottles, jars, and like vessels. *See Abridgment Class Stopping &c.*

chromo-gelatin and like processes. '77. 142. 1367. 3222. '78. 1979. 2007. 2631. 2912. '79. 295. 5223. '80. 1294. 1569. 1647. 2966. 3130. 3511. 3753. 4922. '81. 3504. 3657. 3718. 4394. 5522. '82. 3013. 4747. 5933. '83. 3476. 5681. 5915.

coating plates. *See sensitized plates &c. below.*

coloured screens for dark rooms and the like. *See dark rooms &c. below.*

coloured screens for producing photographs of special character. *See cameras above.*

colouring. '77. 1284. 1560. 3222. '78. 176. 481. 906. 2473. 3196. 4023. '79. 748. 5223. '80. 1569. 2249. 3130. 3355. 3511. 3702. 3753. 4360. '81. 1436. 3504. 3664. 5522. '82. 5131. 5933. '83. 941. 1229. 1960. 2323. 3709. 3800. 5464. 5681. 5947.

composite photographs, producing. '77. 1757. 4380. 4600. '78. 3941. '83. 5947.

copying documents, drawings, and the like. '77. 329. 1891. 4600. 4632. '78. 1458. 1979. '79. 1033. 1073. 1347. '80. 1216. 2304. 2966. 4922. 5013. '81. 3657. '82. 2403. 5933. '83. 1971. 5154.

dark rooms, developing-tents, changing-bags, and the like. '77. 337. '78. 3184. '81. 3628. '82. 3889.

dark slides. '80. 1216. 3353. '81. 775. 3628. 4323. 4967. 4970. '83. 843. 4732.

change-boxes. *See change-boxes above.*

roller slides. *See roller slides below.*

developing. '77. 1264. 1367. '78. 2800. 2912. '79. 1033. 2968. 5223. '80. 1117. 2304. 3130. 3753. 5013. '81. 10. 1436. 3657. '82. 395. 2277. 3889. '83. 1061. 2495. 5915.

dark rooms, developing-tents, changing-bags, and the like. *See dark rooms &c. above.*

diaphragms, lens. *See lenses &c. below.*

drying. '77. 1367. '78. 2912. '81. 1559. 5522. '82. 5131.

dry plates. *See sensitized plates &c. below.*

dusting-on processes for producing positives.

See positives, producing directly below.

electric switches for apparatus. '78. 2746.

Photography—cont.

embossing photographs. '81. 2381. 4394.
 emulsions. *See sensitized plates &c. below.*
 enamelling, [*processes without vitrification*]. '78. 2473. '82. 2780. '83. 1960.
 enamels, [*vitrified only*]. '79. 2187. '80. 1294. 3130. 3753. '81. 1436. 5522. '82. 5933. '83. 5154.
 enlarging. '77. 329. 1891. 4367. '78. 1458. 2174. '80. 2068. '81. 1436. '82. 2780.
 etching. *See Printing, Photo-mechanical.*
 exposures, determining.
 Excepting Photometers and actionometers ;
 for which see that heading.
 shutters, adjusting exposure by. *See shutters below.*
 films. *See sensitized plates &c. below.*
 finishing, [*other than colouring* ; cutting and trimming prints &c. ; embossing photographs ; enamelling ; mounting prints &c. ; re-touching ; varnishing]. '77. 826. 1367. 3109. 3222. '78. 1502. 1646. 2174. '80. 1305. 4360. '81. 5522. '83. 1380. 3709. 5681.
 fixing. '79. 564. '80. 1294. 5013. '82. 5131. 5933. '83. 5915.
 frames and supports for sensitized plates and films. *See change-boxes ; dark slides ; above ; lifters or holders, plate &c. below.*
 frames, printing. *See printing below.*
 glass, cutting. *See Abridgment Class Glass.*
 glazing or enamelling. *See enamelling above.*
 head-rests. *See studio accessories below.*
 intensifying. '80. 3511.
 lamp reflectors for. '78. 1442. '81. 5462.
 lamps—
 actinic. '77. 4367. '78. 1442. 4671. '79. 1207. '80. 2068. '81. 5181. 5462. '82. 4651.
 lenses and lens fittings. '77. 1938. 3461. 4367. 4877. '78. 1493. 3465. 4062. 4756. '79. 4784. '80. 2068. 3353. '81. 775. 1602. 2783. '83. 504.
 lifters or holders, plate and like. '77. 1367.
 lighting, arrangements for, [*other than lamps*]. '77. 4367. '78. 446. 1442. '80. 1216. '82. 3491.
 magic-lantern slides, producing. *See producing magic-lantern slides by below*
 masks and masking. '77. 4380. '78. 1407. 3941.
 mounting prints and the like. '77. 142. 1284. '78. 176. 481. 906. 1502. 1646. '79. 748. 3818. '80. 2249. 3702. 4360. '81. 3664. '83. 1229. 3800. 5681.
 mounts. *See Abridgment Class Artists' instruments &c.*
 negatives for photo-mechanical printing, producing. '77. 329. 1891. 2341. '78. 1407. 1979. '79. 2969. '81. 3657. 3732. 5448. '82. 2156. 2780. '83. 3476. 5204. 5324. 5896.
 negatives of special character. *See producing photographs &c. below.*
 negatives, producing by other means than photography. '78. 1407.
 negatives, washing. *See washing below.*
 ornamenting by. '79. 748. 2271. 5223. '80. 1294. 1647. 3130. 3511. 3753. '81. 3012. 3504. 3657. 5522. '82. 395. 2277. 2780. 3013. 4671. 5933. '83. 5324. 5915. 5947.

Photography—cont.

paper for, making. *See Abridgment Class Paper &c.*
 paper for, treating. *See Abridgment Class Cutting &c.*
 photo-mechanical printing-surfaces. *See Printing, Photo-mechanical.*
 photometers. *See Photometers &c.*
 photo-reliefs. *See producing photographs &c. below.*
 plate and like boxes and receptacles. '78. 3184. '80. 493. 1543. '82. 565. '83. 843. 2316.
 plate-holders or dark slides. *See dark slides above*
 plates. *See sensitized plates &c. below.*
 portraits, working hair into. *See finishing above.*
 positives, producing directly. '80. 2304. 2966. '81. 10. '82. 2277. 5933.
 preservative compositions for use in. *See Abridgment Class Paints &c.*
 printing. '77. 142. 1264. 1367. 1758. 3222. 4380. 4600. 4632. '78. 481. 1458. 1502. 2174. 2631. 2800. 2912. 3941. 4023. '79. 748. 1033. 2187. 2271. 5223. '80. 1117. 1216. 1637. 2304. 2966. 2355. 3511. 4922. 5013. '81. 10. 2142. 3657. 3718. 4394. 5522. '82. 775. 2156. 2403. 2780. 5933. '83. 1061. 1380. 1971. 2495. 5681. 5915.
 photo-mechanical printing. *See Printing, Photo-mechanical.*
 vignetting. *See vignetting below.*
 prints, mounting. *See mounting prints &c. above.*
 producing bird's-eye views. *See producing photographs &c. below.*
 producing magic-lantern slides by. '81. 1436. 5448. '82. 2780.
 producing photographs of special character, [*other than transparencies*]. '77. 1647. 1757. 1891. 3222. 3703. 4380. 4600. 4877. '78. 1458. 1979. 2746. 2912. 3828. 3941. '79. 2969. 5223. '80. 232. 1216. 1294. 1647. 2966. 3511. '81. 10. 1436. 2381. 3012. 3718. 4394. 5448. 5522. '82. 2156. 2277. 4671. 4747. '83. 1960. 4705. 5154. 5204. 5324. 5681. 5947.
 producing statuary by. *See statuary, facilitating &c. below.*
 reducing in size. '77. 329. 1891. '78. 1458. '79. 1073. '80. 1216.
 re-touching. '78. 2174. '80. 2249. 3511. '81. 5522. '83. 4557.
 roller slides. '77. 1647. '81. 1559. 3366. '83. 1971.
 screens, coloured, for producing photographs of special character. *See cameras above.*
 screens for producing negatives for photo-mechanical printing. *See negatives for photo-mechanical printing, producing above.*
 screens for producing photo-mechanical printing-surfaces. *See Printing, Photo-mechanical.*
 sensitized plates and films. '77. 142. 1367. 2341. '78. 481. 2007. 2631. 2912. '79. 295. 564. 1033. 1347. 2095. 2187. 2563. 2967. 2968. 2969. 4607. 5223. '80. 232. 847. 1112. 1294. 2162. 2538. 2782. 2966. 3006. 3130. 3753. '81. 10. 142. 814. 1436. 1538. 1559. 2381. 2526. 3366. 3657. 4896. 5448. 5522. '82. 395. 775. 2277. 2780. 3889. 4747. 5933. '83. 101. 1608. 3948. 5915.

Photography—cont.

sensitized plates and films—*cont.*
 boxes for. *See* plate and like boxes &c. *above.*
 celluloid and like compositions. *See Abridgment Class India-rubber &c.*
 collodion. *See Abridgment Class India rubber &c.*
 gelatine for. *See Abridgment Class Starch &c.*
 photo-mechanical plates. *See* Printing, Photo-mechanical.
 plate-boxes. *See* plate and like boxes &c. *above.*
 printing-paper and printing-fabrics. *See* printing *above.*
 sensitometers. *See* Photometers &c.
 shutters. '77. 329. 1647. '78. 1037. 2603. 2746. 4032. '79. 1183. '80. 1054. 1216. '81. 775. 1559. 2783. 3336. 4320. 4822. 4823. '82. 820. 1621. '83. 1650. 1971.
 squeegees. '79. 3318. '82. 5131.
 stands. *See* camera stands &c. *above.*
 statuary, facilitating production of. '82. 4671.
 studio accessories. '77. 4196. '78. 2544. 2746. '80. 5176. '81. 1517. '82. 3491. '83. 2677.
 chairs. *See Abridgment Class Furniture &c.*
 studios. '79. 2563.
 toning. '77. 1367. '80. 1365. '81. 10.
 transferring films. *See* sensitized plates &c. *above.*
 transparencies, [other than magic-lantern slides]. '77. 826. '78. 2473. 2312. '80. 3130. 3753. '81. 1436. 5448. '82. 2780. '83. 3322. 5681. 5915. 5947.
 trays and dishes. '78. 3181. '82. 3889.
 tripod and like stands. *See* Tripod and like stands.
 turntables for posing sitters. *See* studio accessories *above.*
 varnishing. '78. 2473. '80. 1305. 2249. 3006. '81. 1538. '82. 3013.
 vignetting. '77. 1757. 4380. '80. 2068.
 washing. '78. 3184. '83. 1095.
 weaving diagrams, producing. *See* producing photographs *above.*

Photo-mechanical printing. *See* Printing, Photo-mechanical.

Photometers and actinometers. '79. 807. '80. 185. 3464. 4408. 4833. '81. 821. 1751. 5368. '82. 6034. 6114. '83. 393. 4443.

Phototypes. *See* Printing, Photo-mechanical.

Printing photographs. *See* Photography.

Printing, Photo-mechanical. '77. 329. 591. 1773. 2311. 4009. '78. 1502. 1979. 2912. 3243. 4146. '79. 1033. 1073. 1347. 2039. 2611. 2724. 2967. 2969. 3760. 3816. 4738. '80. 232. 1419. 1570. 1637. 1856. 1909. 2782.

Printing, Photo-mechanical—cont.

3350. 4949. '81. 266. 1096. 1436. 2527. 3012. 3504. 3570. 3657. 3732. 4394. 5177. 5448. '82. 388. 2156. 2780. 4562. 4747. 5086. '83. 896. 1380. 3177. 3362. 3476. 3948. 4152. 4153. 4154. 4471. 4705. 4735. 5151. 5204. 5324.

photographic negatives for. *See* Photography.

Prints, Photographic. *See* Photography.

Re touching, Photographic. *See* Photography.

Screens, Photographic. *See* Photography.

Sensitized plates and films, Photographic. *See* Photography.

Sensitometers. *See* Photometers &c.

Shutters, Photographic. *See* Photography.

Squeegees, Photographic. *See* Photography.

Standards, Telescopic. *See* Tripod and like stands.

Stands, Tripod and like. *See* Tripod and like stands.

Telescopic stands. *See* Tripod and like stands.

Tripod and like stands, [including Telescopic and other adjustable pedestals and standards]. '77. 28. 539. 2398. 2532. 3277. 4027. 4316. '78. 20. 2084. '79. 104. 3471. '80. 755. 1095. 2172. 4087. '81. 775. 979. 2168. 2237. 3014. '82. 3232. 4564. '83. 393. 568. 4297.

Excepting Easels, [Abridgment Class Artists' instruments &c.]; Lamps and burners for lighting &c., (pedestals and stands), [Abridgment Class Lamps &c.]; Reading-desks and music stands, [Abridgment Class Furniture &c.]; Stands, Card, photograph, and like, [Abridgment Class Furniture &c.]; Velocipedes &c., (stands), [Abridgment Class Velocipedes];

for which see those headings.

camera stands, attachments for. *See* Photography.

levels for. *See Abridgment Class Philosophical instruments.*

Turntables for posing models. *See* Photography.

View-finders, Photographic. *See* Photography.

Vignetting, Photographic. *See* Photography.

NAME INDEX.

The names in *italics* are those of persons by whom inventions have been communicated to the applicants for Letters Patent.

Abel, C. D....'77. 1264.	'81. 775
	'83. 101
Adams, J.'83. 2323	
Addenbrooke, G. L....'82. 1621	
Alder, G. E.'78. 1442	
Alissoff, M.'77. 591	
Allgeyer, J.'83. 896	
Anderson, F.'79. 2187	
Andreoli, E.'80. 3511	
Arnold, U. K.'79. 101	
Atkinson, J. E.'83. 4732	
Attout, P. A.....'83. 101	
Bailey, J. W.....'80. 1294	
Balencie, A.....'79. 2187	
Baozie, E. T. de.....'81. 5462	
Barnes, R. W.'82. 5086. '83.	
1380. 3476. 4471. 4705	
Baum, F.....'80. 1856	
Beck, W. H.'81. 2142	
Becker, Fickcissen &.....'83. 3948	
Beer, A. J.....'83. 393	
Bell, G. C.....'80. 232. 1637	
" J.....'82. 5086. '83. 1380	
3476. 4471. 4705	
Benecke & Fischer.....'83. 3362	
Bisson, A.'83. 5681	
Blair, T. H.'80. 498	
Blakely, W.'83. 568	
Blamires, J. H.....'79. 4784	
Blin, A. P.....'77. 3703	
Boca, P.'81. 4922	
Bogen, F.....'77. 2532	
Bogue, D.'81. 3570	
Bolas, T.....'81. 4823	
Bolhoevener, C.....'78. 4146	
Bolhoevener, C.....'83. 896	
Bonnaud, J. B. Germeuil....'78.	
4023	
Bonnaud, J. B. Germeuil....'80.	
3511. '81. 775	
Bonneville, H. A.....'81. 2381	
5522	
Bonneville, J. M. A. L '81.	
814	
Borland, A.....'79. 2611. '83.	
5896	
Boule, L. A.'77. 3703	
Brandon, R. H.....'83. 1608	
Branson, F. W.....'83. 1650	
Brassinne, H.'78. 1646	
Brewer, E. G.....'77. 3703 '79.	
2271. '81. 4822. '83. 4557	
Brookes, W.....'77. 826. '81.	
4320	
Brown, J.....'83. 5154	
" R....'82. 5086. '83. 1380	
3476. 4471. 4705	
Brown, W. Morgan....'77. 1367	
'78. 2746. 3465. '80. 3702	
Brydges, E. A.'80. 2162	
Cadett, J. W. T.'77. 4367	
'78. 1097	
Capron, E.'77. 4009	
Carvalho, D. N '79. 2563	
Caspar, A. M. F.....'83. 3800	
Cebrian, J. C.....'80. 1216	
Chabrel, E. J.....'81. 2168	
Chadwick, J.'80. 1054	
" W. L.....'80. 1054	
Chaine, J.'82. 5131	
Chaligny, S. de '82. 5131	
Christian, L.'81. 10	
Clark, A. M.....'79. 5223. '80.	
3130. 3753. '81. 10. 3732	
4970. '83. 941. 2677.	
Clarke, J. A.'78. 1442	
" J. P.'80. 5176	
Clayton, J.....'83. 101	
Coghlan, J. H.'81. 1096	
Coglienna, D.'80. 3464	
Collins, J. S.....'79. 3816	
Colton, E. G.'82. 3491	
Cooke, W.'83. 1971	
Corba-sière, (dit Christian), L.	
'81. 10.	
Cowan, A. ...'78. 2618. '82. 565	
Cros, C.'83. 2495	
Cussous, D. H.'78. 2608	
Dale, G.....'78. 176	
" H. J.'83. 1007	
Davis, A.....'78. 2084	
Dawes, A. H.'83. 1229	
Decouflé, A. E.'80. 2219	
Dewé, J.'81. 3661	
Didot, A. Firmin.....'79. 2187	
Dillon, T. A. ...'79. 1073. 1207	
1347	
Dredge, J.'80. 4949	
Drummond, G. P.'77. 329	
Duplessy, A. A.....'79. 1033	
Durand, A.....'82. 5131	
Dutkiewicz, B. de.....'80. 2249	
Duvivier, L.'77. 4009	
Eastman, G.'79. 2967. '80.	
3006	
Edwards, B. J.'77. 1891. '80.	
1543	
" E.....'80. 4922. '81.	
1517. '82. 3889	
Elliott, A. H.'77. 4027	
Emery, F. J.'82. 4747	
Emmens, S. H.'82. 6114	
Emmerson, E. E.'78. 2544	
Enjalbert, E.'81. 4970	
Evans, C. P.'82. 4671	
Favre, L.....'80. 1569	
Fickcissen & Becker....'83. 3948	
Firmin-Didot, A.'79. 2187	
Fischer, Benecke & ...'83. 3362	
Fischer, W. H.'80. 1570	
Flagler, H. K.....'80. 2782	

Frank, J.'83. 3362
Frank, R. E.'82. 5933

Garside, H.'83. 5204
Garthwaite, W.'78. 1458
Gresbergen, J.'83. 4557
Germeuil-Bonnaud, J. B.'78.
4023

Germeuil-Bonnaud, J. B.'80.
3511. '81. 775
Geruzet frères, Soc.'83. 4557
Godard, E.'82. 2277
Goodwin, H.'78. 3243
Greaves, E.'77. 1757. 1758
Grüne, W.'80. 4360
Guillebaud, W. H.'81. 2381
4394
Guillot, L.'79. 2271
Gurney, J.'78. 2473
Guttenberg, M.'78. 1502

Haddan, H. J.'77. 337. '79.
2563. '81. 1538. 3628. '82.
2277.

Hallett, F. H.'80. 3355
Hare, G.'82. 3035
" J. H.'83. 1007
Harman, A.'78. 2174
Hasler, G. A.'77. 539
Hassfield, M. S.'77. 3277
Hedou, E.'77. 3277
Heidenhaus, E.'78. 4146
Hely, A. A.'79. 564
Hemery, T. G.'77. 4380
Herzog, C.'78. 1407. '79. 2039
Hildebrandt, J. A. R.'77.
4316

Hoesch, F. C.'81. 3504
Hoffman, D.'78. 2084
Holden, C. W.'83. 4297
Holmes, A. L. E. H.'79. 3471
Holmes, J. G. H.'79. 3471
Holroyde, J. B.'81. 2526
Hurter, F.'81. 1751
Hutinet, J. J. D.'81. 1538

Imray, J.'83. 2495
Irlande, E. J.'82. 3013

Jacobsen, E.'77. 3109
Janard, J. B.'79. 2271
Jensen, P.'77. 3109
Johnson, J. H.'77. 2341. 4632
" J. R.'78. 2007. 2631
Johnson, J. R.'77. 1367
Joltrain, A.'80. 2304
Jones, R. A.'79. 3818
Justice, P. M.'81. 3664. '82.
2403

Kaiser, F.'79. 1033
Kamping, F. W.'78. 3465
Kepler, A.'83. 5464
Kidd, R. L.'82. 2780
Knapp, J. A.'78. 3465
Knott, R.'80. 2538
Kurtz, W.'82. 3491

Lake, H. H.'80. 2172. '82.
3013. 5131. '83. 4297
" W. R.'77. 1773. '79.
2967. '80. 1216. 1305. 2782
3006. '83. 1061. 5681.

Lambert, H.'77. 142
Lamy, P. E.'81. 1538
Lane, J. T.'78. 3941
Lawley, W.'81. 5598
Lefèvre, H.'79. 1371
Lefeurrier, J.'81. 3628
Lehmann, C. H.'77. 4877
Lehmann, H.'77. 539
Lémery, J. E. P.'79. 5223
Le Moussu, B. C.'81. 3570
5177
Liebert, A.'81. 10
Ligne, P. de'81. 2237
Limbeck, W. S.'80. 4408
Lindop, W. E.'83. 2677
Liveing, E. H. T.'80. 4833
Loiseau, A.'81. 775
Lombardi, A.'78. 3196
Lumière, A.'83. 2316

McIlvenna, F.'81. 979
McLellan, J. Y.'82. 4651
Marlow, E.'83. 504
Marra, F. A.'83. 3709
Martyn, A.'80. 1647
Marr, E.'79. 2563
Maxfield, J.'77. 2398
Maybridge, E.'78. 2746
Meihé, J. R.'81. 3504. '83. 896
Meisenbach, G.'82. 2156
Mewburn, J. C.'80. 1569
Meyer, G.'83. 941
Micciullo, L.'82. 5933
Michaud, A.'78. 1979
Michaud, A.'81. 3732
Mills, B. J. B.'83. 2316
Molera, E. J.'80. 1216
Morgan-Brown, W.'77. 1367
'78. 2746. 3465. '80. 3702
Morgan, P.'81. 2142
Morgan, T.'80. 1095
" W. T.'81. 5448. '82.
2780
Morici, A.'80. 1095
Moss, J. M.'82. 388
Mucklow, J. D.'81. 5368
Mumler, W. H.'77. 1773
Muuro, J.'82. 6114

Nawrocki, G. W. von... '77. 1560
'73. 4032. 4756. '80. 4408
Newton, H. R.'78. 481

Parkhurst, E. G.'80. 2172
Parkyns, Sir T. G. A.'77. 3222
Pass, E. de... '77. 4027. '81. 4394
Pellet et Cie., Soc. Henri... '77.
4632

Pelzer, F.'77. 4316
Percire, C. G. R.'77. 2341
Petit, C. G.'79. 4738
Philippi, L. H.'82. 4562. '83.
3177

Pigeau, A.'83. 5464
Piquet, P.'81. 2142
Pixis, T.'80. 3702
Plener, J.'81. 4896
Plücker, J. F.'82. 3232
Ponsolle, N.'77. 4009
Poznainski, D.'77. 28
Prager, A.'78. 906
Premion, A. M. de... '83. 5464
Pumphrey, A.'81. 1559. 4967
Puttemaus, G.'77. 337

Reynolds, J. E.'80. 1112
" R.'83. 1650
Richardson, W.'77. 4600
Richmann, H.'79. 104
Ritchie, J. H.'79. 2095
Robey, G.'83. 1960
Rogers, J.'81. 3366
Rouaix, P.'82. 3889
Rouch, S. W.'78. 1448
Rydl, G.'83. 3822. 5947

Sachs, J. J.'79. 2724. '80.
1419. 1909. 2966. 3650. '81.
266. 3012. 3657. '83. 3948
5324.

Salvy, E.'79. 295
Samuels, T.'83. 843
Sands, C.'81. 2783. 4323
Sarony, O.'78. 2007. 2631
Schlotterhoss, R.'83. 1971
Schneider, G.'77. 1560
Schnorreuberg, N.'80. 4360
Schroer, R.'82. 395
Schulmacker, J.'79. 748
" J. C.'77. 1284

Scotellari, D.'77. 337. '80.
3130. 3753. '82. 5933
Scotellari, D.'77. 3461
Scott, F.'79. 3816
" W. L.'78. 4671
Siemens, W.'83. 4443
Simmonds, R.'81. 5181
Slack, J.'77. 4600
Smith, G.'81. 3014
" J.'77. 1758
Snook, W. Wilmot-....'79. 564

<i>Soc. Geruzet frères</i>'83. 4557	Thorp, T.'81. 821	<i>West, B. C.</i>'83. 1061
<i>Soc. Henri Pellet et Cie</i>'77. 4632	Tiator, J.....'78. 3184	<i>R. B.</i>'83. 1061
<i>Spring, R. Y.</i> '78. 3465	<i>Tillet, M.</i>'80. 4922	Weyde, H. Vander.....'78. 446
Spurge, J. B.....'79. 1183	Tydeman, E. M. T.'78. 1493	Wharton, A. L.'80. 4087
'81. 5368	4062	Whitcher, J.'79. 1183
<i>Stade, G.</i>'79. 748	Unger, J.....'82. 4564	White, J. P.'77. 4196
Stanford, E. C. C.'81. 142		Wild, A. J. T.....'80. 5013
Stanley, W. F.....'80. 3353		Willis, W.'78. 2800. '80. 1117
'82. 3268		Wilmot-Snook, W.'79. 564
Starling C. C.....'82. 6034	<i>Fergeraud, A.</i>'83. 2495	<i>Winter & Co, H. M. L.</i>'80. 1305
Starnes, H. S.....'81. 5598	Vernon, J.....'80. 755	<i>Winter, H.</i>'77. 1264
<i>Stegemann, A.</i>'78. 4032	Vickers, T.'82. 820	Wirth, F ...'82. 2156. '83. 3362
Steinheil, H. A.....'81. 1602	<i>Voget, H. W.</i> '80. 2162	Wise, W. L.'77. 1284. '79. 748
Stephenson, G.'78. 3828	Voigtlander, F. von ...'77. 1938	Wolff, J.....'81. 3718
<i>Street, G. S.</i>'82. 2403	<i>Voigtländer F. con.</i>'78. 4756	<i>Wolff, M. G.</i> '81. 5522
Swan, J. W.....'79. 2968. 2969		Wolfram, J. H. G.'80. 847
4607		Woodbury, W. B.'77. 1647
		'78. 2912. '79. 3760. '81. 2527. '83. 4735.
<i>Tailfer, P. A.</i> '83. 101	Wall, R. T.'82. 775	Wright, F.....'79. 807
Tasker, R.....'81. 821	Ward, J.....'78. 20	
Tattersall, J. W.'83. 1095	Warlich, F. H. ...'77. 4367. '80. 2068	
<i>Testu, E. L.</i>'77. 3703	Warnerke, L.'80. 185. '81. 1436	
<i>Thiébaud, A. C. A.</i>'83. 1608	Warren, W. H.'83. 5915	
Thompson, S. P.....'82. 6034	Wayte, C.'78. 1407. '79. 2039	
" W. P.....'80. 2304		Zuccato, E. de...'83. 4152. 4153
'81. 2237		4154



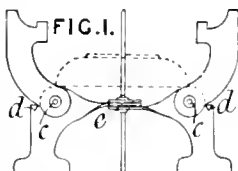
PHOTOGRAPHY.

Patents have been granted in all cases, unless otherwise stated. Drawings accompany the Specification where the abridgment is illustrated and also where the words *Drawings to Specification* follow the date.

A.D. 1877.

28. Poznainski, D. Jan. 2.

Tripod and like stands.—Relates to folding stands in which the parts are stamped out of sheet metal. Each branch is in two parts, riveted or jointed at *c*. A lip *d*, or a stud, may act as a stop for the upper parts or arms when the stand is in use. An ordinary central pivot *e* enables the stand to be folded flat, and the joints *c* enable it to be folded into still smaller compass.



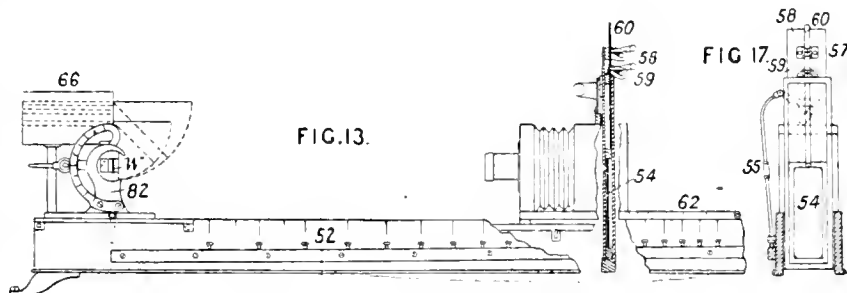
during the printing-process, and in a method of mounting the print. The tissue is coated, either before or after it is sensitized, with a permanent transparent support consisting of Canada balsam, collodion, castor oil, and turpentine varnish. The tissue is cut to size, and printed from a negative as usual. When removed from the frame the print is immersed in warm water containing (say) 2 drops of ammonia to 20 ounces of water, and developed. It is next washed in weak alum solution, raised from the water by means of a piece of glass or cardboard passed under it, and placed in clean water with its developed side downwards. It is raised from this bath in position on the final mount. For the final mount, white or tinted enamelled cardboard waterproofed on one side, by varnish or collodion, is preferred, but various other substances may be used as mounts. If an unglazed surface to the print is required, the mount is prepared by coating it with collodion thickened with a white pigment—zinc white or starch. To facilitate development the tissue may be manipulated on a sheet of glass or cardboard.

142. Lambert, H. Jan. 11.

Chromo-gelatine processes; sensitized films; mounting prints.—Relates to the production of carbon or other permanent photographs, and consists in means for supporting the sensitive tissue

329. Drummond, G. P. Jan. 25.

Photo-mechanical printing; cameras.—Relates to a printing-process in which the matter is first printed, in a composing-machine of the type-writer type, on a continuous elastic ribbon, which is stretched in a frame and photographed line by line. The negative

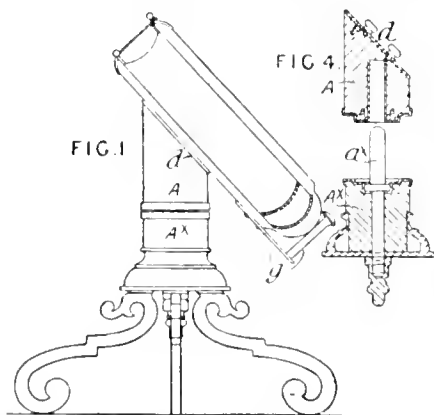


thus produced is employed in the preparation of a printing surface in any well-known way. As shown in Fig. 13, the printed ribbon *w* is held in a frame 82, and each line is justified by being stretched between two fixed points which determine the length of the line. The camera moves on graduated ways 52, and is placed with its pointer on the mark corresponding to the size of type in which the final printing-operation is to be effected. The focussing is effected by placing the camera on the corresponding position on the ways 52, determined by a pointer and scale. The lever 55, Fig. 17, is then actuated to raise the sensitized plate 54, and the shutter 57. After the desired exposure, the lever is replaced, dropping the shutter, but leaving the plate in its raised position. When the shutter is raised, it raises a pawl which grips the extension 60 of the plate. A second pawl prevents the plate dropping when the shutter is replaced. When the shutter is again raised to expose a second line, the plate is raised to bring a fresh surface behind the aperture. The casing 66, attached to the stand 82, contains glass screens which can be suspended in front of the ribbon to produce ornamentation &c. of various kinds. The ribbon can be twisted or placed at various angles to produce any desired contortion of the type as reproduced on the negative.

- 337. Haddan, H. J.**, [*Scotellari, D.*, and *Puttemaus, G.*]. Jan. 26. [*Provisional protection only.*]

Coloured screens.—A violet tinted or coloured medium through which the rays of light shall pass for the various manipulations in photography, consists of glass coated with a varnish composed of copal gum, oil of lavender, camphor, and turpentine, coloured with dragen's blood and "iron prussiate." The mixture is filtered and is applied cold.

- 539. Hasler, G. A.**, [*Lehmann, H.*, partly]. Feb. 8.



Tripod and like stands.—Stands for photographic albums, ladies' companions, portfolios, and

other like articles, are made in two parts. The upper part A holds the article in an oblique position, and fits on a vertical spindle *a*^x, Fig. 4, secured to the lower part A^x, on which it is free to revolve with the article attached thereto. For attaching the article to the stand, a plate *d*, fastened to the upper part, carries studs to engage with slots in the underside of the article. Angle-pieces *g* are fitted to the article to prevent undue strain when it is opened.

- 591. Alisoff, M.** Feb. 12. *Drawings to Specification.*

Photo-mechanical printing.—Relates to a method of preparing surfaces for printing music and other printed matter. The signs or letters, preferably three or four times the usual size, are first printed on sheets of unsized paper, which are either transparent or translucent, and these sheets are then cut up; or they are cut or stamped directly from black or coloured paper. The composition is set up by simply pasting these signs, in accordance with the manuscript copy, upon a suitable background. From the original thus prepared, a reduction may be made by photography, and from the negative the design may be printed by the usual photo-lithographic, photo-relief, or photo-engraving process.

- 826. Brookes, W.** March 1. [*Provisional protection only.*]

Transparencies; finishing.—Paper negatives and positives are rendered transparent by waxing them. The negative or photograph is placed on the flat top of a box or closed vessel, which is provided with a feed opening for water and an escape valve or opening for steam, and is heated by a series of gas jets. When the paper is thoroughly heated it is waxed over with white wax, and the surplus wax removed with a cloth. The paper is allowed to cool or set in a press.

- 1264. Abel, C. D.**, [*Winter, W.*]. March 31.

Printing fabrics; developing.—Enlarged positives are produced on woven fabrics by impregnating the fabrics with either iodide or "chromide" of silver; or a solution of the "chromides" of potassium and cadmium; or a solution of silver nitrate and citric acid. The fabric is preferably printed by means of electric light, developed in a solution of pyrogallie acid and citric acid, and washed, toned, &c., as usual.

- 1284. Wise, W. L.**, [*Schulmacher, J. C.*]. April 2.

Colouring.—Photographs of oil paintings &c. are coloured by tints applied at the back. The unmounted photograph is rendered transparent by

applying copal varnish to the back. When the copal varnish is dry, it is covered with retouch varnish, upon which, when dry, are laid the oil colours. The colours are covered with copal varnish, and the picture is mounted upon cartoon paper or canvas by means of starch mixed with glue and turpentine.

1367. Morgan-Brown, W., [*Johnson, J. R.*]. April 7.

Chromo-gelatine processes; toning; lifters or holders, plate and like; sensitized films.—Relates partly to the production of carbon or other permanent photographs, by what are known as the double transfer and the simple or single transfer processes. According to one part of the invention alizarin is substituted for the cochineal pigments hitherto employed, and in order that the alum or zinc salt used in preparing the lakes of alizarin shall not make the gelatine of the pigment paper insoluble and so stain the whites of the picture, a minimum quantity of these salts is employed, and they are supplemented by a lime or magnesian salt. Prints produced by such lakes are toned by a weak solution of perchloride or persulphate of iron to which a few drops of hydrochloric acid have been added. The invention further relates to the preparation of pigment paper, or sensitizing prepared paper by immersion in a solution of a bichromate. After immersion it is laid on a level surface heated to a temperature of from 90° to 100° F. This temperature is maintained for from 15 to 30 minutes, and the paper when cooled is hung up to dry. By this treatment the coarser particles of pigment are allowed to settle to the lowest stratum of the pigment compound, and more delicate half-tones and more vigorous shadows are obtained. The third part of the invention consists in using waterproof cardboard, or sheet metal coated with a highly-glazed impervious paper, instead of glass or porcelain as a temporary support during development. The fourth part of the invention relates to the treatment of the print after it has been fixed by immersion in alum, and consists in allowing the print to drain well after rinsing it in water. It is then coated with gelatine rendered opaque by a white pigment, such as zinc white. When this coating has set a sheet of thin wet tissue paper is pressed upon it, and when the whole is dry it is removed for mounting. Or the thin paper may be omitted and the card mount applied directly upon the gelatine. According to the fifth part of the invention a solution of gelatine, say 4 per cent., with a small quantity of chrome alum, is used instead of collodion for preparing a temporary support when a polished surface is required. The invention further relates to a new method of obtaining reverse negatives. A previously prepared double film of gelatine and collodion is applied to the surface of the negative, under water, which is slightly warmed and mixed with alcohol to prevent the gelatine from absorbing water and swelling and curling up. They are lifted simultaneously out of the fluid and pressed together, and when cold the pellicular flexible negative is

lifted from the plate. In the above double film, the collodion may be dispensed with or replaced by transparent paper. For very large negatives, a sheet of plate glass has its edges coated with a solution of caoutchouc, and to it is then applied a sheet of thin transparent paper wetted with a solution of bromide of potassium. When dry a coating of bromide of silver emulsion is applied. After developing and fixing, a sheet of gelatinized paper is applied, so that the negative is imprisoned between two sheets of transparent paper. The pellicle or paper used may have a border or other device previously printed on it. In a further improvement in single-transfer pigment printing, a card or board formed of two or more layers of paper cemented together by a cement insoluble in water is used instead of the usual transfer paper. Thus prints of enlargements or of a collection of cartes-de-visite are obtained upon the board without any intermediate mounting being necessary. Any number of negatives may be printed together if properly trimmed and made of equal density. The grain of the paper is hidden by an enamel of kaolin or starch, which does not lead to stains like zinc, lead, or barytes white. An extremely thin single transfer paper, chiefly for use in book illustrations, is prepared by immersing very thin "papier vegetale" in a solution of shellac in aqueous ammonia and albumen. The prints when dry, and touched if necessary, are treated with a weak solution of shellac and glycerine, or are enamelled with collodion and glycerine as usual.

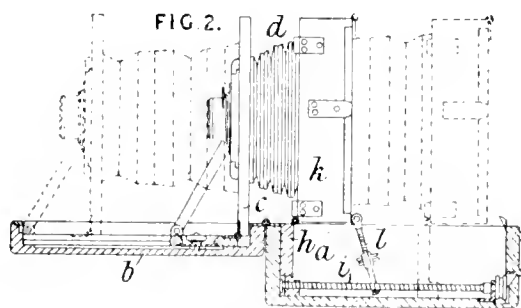
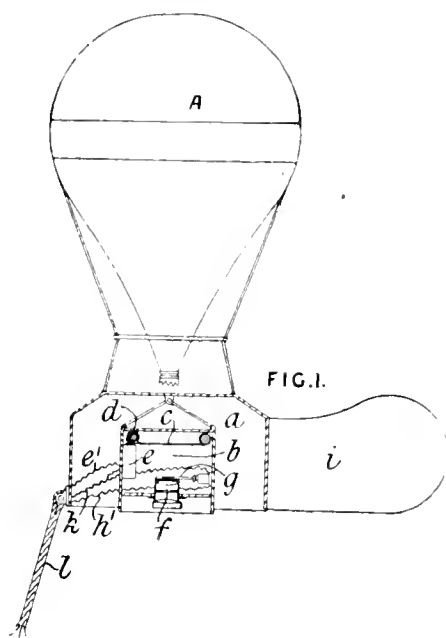
1560. Nawrocki, G. W. von, [*Schneider, G.*]. April 21. [*Provisional protection only.*]

Colouring.—The paper photograph, prepared as usual but toned to a blue tint, is coated on its back with starch paste, and, when dry, is fixed with its front side against a glass plate by means of a glue or gelatine solution. This solution is then applied to the back, and, when dry, is washed off with the starch coating by means of a sponge and warm water. The photograph is then rendered transparent by an application of mixed rape-seed oil and unsalted lard, and this coating is removed by rubbing with blotting paper. Ordinary oil colours are then applied in flat tints, and, when dry but still sticky, the picture is coated warm with a mixture of wax and turpentine and finally with copal varnish.

1647. Woodbury, W. B. April 27.

Producing birds-eye views.—In order to take photographs from a height above the earth, the camera is carried by a captive balloon and is manipulated from the earth by means of electromagnetic apparatus. A box *a*, Fig. 1, having an open bottom, is attached to the balloon in place of a car. The rope *l* which connects the balloon to the earth is attached to one side of the box, and a rudder or fan *i* to prevent the balloon from turning round is fixed to the opposite side of the box.

The camera *b* is pivoted at the top of the box so as to be always horizontal, and a dark slide, provided with two rollers carrying a sheet of sensitive paper *c*, is arranged above the lens *f*. The rollers

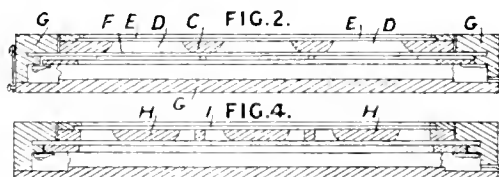


are actuated by clockwork *d*, and when the electric circuit is completed or broken, a detent is released by an electromagnet and the paper is unrolled from one roller on to the other. Another electromagnet acts upon a shutter *g* to uncover and reclose the lens *f* when desired. The wires *e'*, *h'* for actuating the clockwork and the shutter, and the return wire *k*, are contained in the rope *l*. When the balloon is elevated to its proper position, the circuit of the second magnet is completed and the surface *c* exposed. The clockwork is then actuated so as to give a fresh surface for the next exposure, and so on, thus enabling a series of photographs to be obtained.

Cameras.—The back *k*, Fig. 2, of a camera is arranged to fold or pack in the bottom of a box *a*, and the front *c* in the lid *b*. The front corner of the back part of the camera is hinged on a frame *h* sliding in the body of the box by means of a

screw *i*. The front of the camera may be turned on a vertical pin, and the back part may be inclined to the vertical by means of an adjustable screw *l*. The position of the lens and front *c* is indicated by a scale in the lid. The slide for dry plates is a thin wooden frame joined at the corners, and having an opening at one end through which two plates, placed back to back and pressed outwards by a spring between them, can be inserted. Instead of a wooden slide for giving exposure to the plate a sheet of thin metal, which can be held back when desired and returns to its original position when released, is used. Or a thicker piece of metal carried by a thin flexible piece may be used.

1757. Greaves, E. May 5.



Vignetting; producing composite photographs.—In a vignetting arrangement a board *C*, Fig. 2, having openings *D* corresponding in number and position to the pictures required, rests upon a glass sheet *F* in the printing-frame *G*. The edges of the openings are bevelled towards the pictures so that the light is diffused and the edges of the pictures are softened. The board is covered by a sheet of ground glass *E*. For toning the margins, the vignetting-board is replaced by a ground-glass sheet *I*, Fig. 4, to which are secured blocks *H* which occupy exactly the positions previously occupied by the openings. The inner edges of the blocks are bevelled similarly to those of the openings. Instead of blocks being attached to the glass, the glass may be painted, or paper masks or other material attached thereto. Dark "papier mineral" or glass with light places thereon may also be used for the vignetting, and light "papier mineral" with opaque places for the toning process. In both cases the lines separating dark and light places are stippled or softened. Composite photographs may be obtained by superimposing landscape films and gelatine films with stippled effects, or other designs.

1758. Greaves, E., and Smith, J. May 5. [Provisional protection only.]

Printing; masking.—A printing-frame holding several negatives has a lid or door hinged to the top edge, and is provided with interchangeable inner frames over which is stretched parchment, parchment paper, or vellum. The parchment &c. has openings of the size and number required, and the sensitized paper is cut to fit the inner frames, against which it is pressed by means of an air

cushion or pad on the lid of the glazed frame. Pads of wood, pasteboard, &c. may be pressed on the negatives by springs. The margins are tinted by transferring the paper to another frame containing a number of framed removable glasses, on which black masks are fixed corresponding with the openings in the parchment frames.

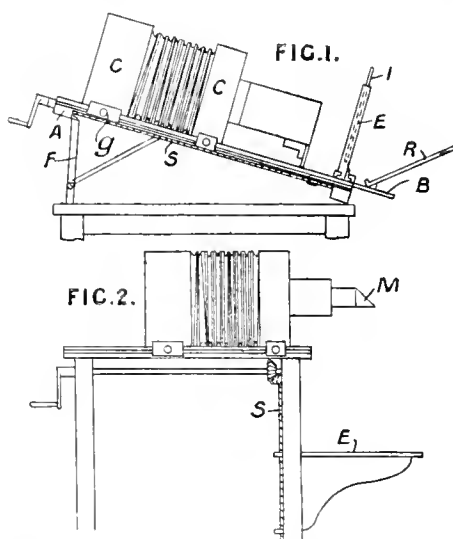
1773. Lake, W. R., [*Mumler, W. H.*]. May 7.

Photo-mechanical printing.—In a method of producing a printing-surface by photographic means, gelatine, water, glycerine, and a saturated solution of potassium bichromate are heated together in a vessel, and, after the ingredients are thoroughly mixed together, the mixture is poured upon a smooth level metal or glass plate having a ledge round its outer edge, the surface of the plate being previously rubbed with tallow to prevent the film from adhering thereto. When the film is dry, it is removed from the plate and is exposed under a negative to the sunlight; it is then secured with its printed face uppermost to a glass, metal or other base by means of liquid glue or otherwise. After rubbing the upper surface of the film with tallow in order to prevent scratching, the surface is made flat by grinding it with emery paper or cloth attached to a wood or other block, and is then treated with acetic acid for dissolving the parts of the surface of the film not acted upon by light; when sufficient material has been removed, the acid is washed off by warm water, and any traces of acid may be neutralized by ammonia fumes. If sufficient material is not removed by the acid, the interstices are filled or coated with a paste composed of mucilage or other gum and boneblack, or with indian ink, black shellac varnish, or other opaque substance, and the film is exposed to actinic rays without the negative. After the removal of the paste &c. by suitable solvents, the film is again treated with acetic acid in a dark room, and, when dry, is electrotyped for use as a printing-surface.

1891. Edwards, B. J. May 15.

Cameras; camera supports; copying documents, drawings, and the like.—Relates to cameras for copying pictures, drawings, photographs, or designs to an enlarged, reduced, or unaltered scale. When the picture consists of a transparent positive or negative, it is placed in a frame I, Fig. 1, and the light is reflected through it by a reflector R. An opaque picture &c. is fixed to the board E. The distance between the picture and the camera is adjusted by the screw S, which, at the upper end, is connected to the frame A, and at the lower end is connected to a sliding board B carrying the board E and reflector R. The camera C is attached to the board A by clamps *g* which slide in grooves so that the camera may be drawn out as desired. The board A is supported by a frame F. To produce reversed negatives such as those used for photo-mechanical printing, the drawing &c. is supported

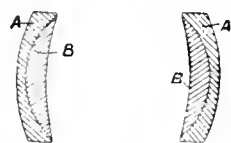
on a horizontal table E, Fig. 2, the distance of which from the reversing-mirror or prism M is



adjusted by a screw S rotated by bevel wheels as shown.

1938. Voigtländer, F. von. May 17.

Lenses.—Symmetrical photographic lenses are formed of two double achromatic combinations A, B, so placed that the concave sides face each other. The curvature of the lenses is such that the radii bear a certain proportion to the focal length of the lens. Flint glass of high specific gravity and great refracting power is used for the lenses, so that they are over-corrected for visual rays, but are accurate for actinic rays. By the same means the focal length is shortened to only about six times the diameter of the aperture.



2341. Johnson, J. H., [*Percire, C. G. R.*]. June 15. [*Provisional protection only.*]

Sensitized plates; photo-mechanical printing.—In the production of photographic reliefs from which moulds for casting or otherwise obtaining printing-surfaces, medallions, jewellery, &c. are made, indian ink or any desired colour is mixed with a warm solution of gelatine, and the solution is then run under a damped sheet of paper spread on a glass plate. When very thick sheets of gelatine are required, the edges of the paper may be supported by metal flanges. The plates of gelatine on paper are dried in a stove, and, when about to be used, are dipped in a solution of potassium bichromate and dried. The sensitized plate is finally exposed to the light behind a photographic or other glass

plate having the design thereon. After exposure, the gelatine is placed on glass with the paper uppermost, the hardened surface being attached to the glass by means of gum-lac &c. The paper and the soft gelatine are washed off with warm water, the remaining hardened gelatine being then dried, varnished, and used as a relief for the production of a mould.

2398. Maxfield, J., and Maxfield, J. June 20. [*Provisional protection only.*]

Tripod and like stands.—Relates to stands for cooking-vessels &c., in which the legs are hinged on a ring. At one end of each leg is a hook-like projection. The points of these projections, when it is desired to set the stand up, are fixed in a circular groove at the bottom of the vessel, and are held there by the elasticity of the hinges. To pack the stand, the legs are turned into a position in which they are parallel with the plane of the ring.

2532. Bogen, F. June 30. *Drawings to Specification.*

Tripod and like stands.—A folding stand for a barometer consists of a small bed to support the lower end of the tube, having three legs which are provided at their ends with levelling screws, and with hinged arms, which unite at their upper ends to clasp the long leg of the barometer.

3109. Jensen, P., [Jacobsen, E.]. Aug. 15. [*Provisional protection only.*]

Finishing.—Photographs are polished in a machine consisting of a circular wire, bristle, velvet, cloth, felt, or other brush, which slides along a rotating flat iron blade, and is provided with a loose ferrule to be held by the hand when moving the brush. The blade is attached by an india-rubber cylinder to a shaft rotated by treadle or other gearing, and is bent into the various positions required. To facilitate polishing thin articles, the machine table is provided with a loose table or flap.

3222. Parkyns, Sir T. G. A. Aug. 24.

Chromo-gelatine processes; colouring; finishing; printing.—Relates to the chromotype and autotype photographic printing processes, and to the colouring or tinting. The medium used is preferably collodion and consists of a solution of medium pyroxylin in methylated ether and methylated alcohol, and the colours used are dry pigments, principally earths and permanent pigments such as the madders. The colours are mixed and ground in a mortar, and are then added to the filtered collodion and shaken up. The autotype double transfer process is followed so

far as the fixing with alum water, washing, and drying of the tissue developed picture in wax or gelatine, and the coloured collodion is then made to flow over it and allowed to set, after which, the plate is plunged into cold water. The further treatment proceeds as usual, the picture being subjected to pressure, and dried in a warm room. Albumen, gum, gelatine, &c. may also be used as media, and large quantities of white, principally zinc, may be used as a body colour. Green chromium oxide, umbers, siennas, and other colours may be used pure, or mixed with white. After drying, the print may be plunged into cold water to reduce the gloss and produce a semi-matt surface, and then partially dried between blotting-paper and mounted.

3277. Hassfield, M. S., [Hedou, E.]. Aug. 29. [*Provisional protection only.*]

Tripod and like stands.—Relates to a method of uniting the legs of a music stool to the central column, which method may be applied in the construction of stands. The legs are shaped and joined together so that they form conical projections above and below the feet. The upper cone fits into a corresponding recess in the column, while a plate or nut is recessed to receive the lower cone, and is secured to the column by a screw bolt.

3461. Scotellari, D. Sept. 14. [*Provisional protection only.*]

Lens fittings.—An apparatus for reducing the time of a sitting consists of a cap which is placed over the lens of the camera, so that the light has to pass through it on its way to the lens. At or about the centre of the cap is an aperture "wherein some transparent substance is placed, but rendered opaque, and coloured either violet, indigo, purple or blue," so as to allow actinic light to pass. The aperture is furnished with a cover.

3703. Brewer, E. G., [Boulé, L. A., Blin, A. P., and Testu, E. L.]. Oct. 4. [*Provisional protection only.*]

Producing photographs in relief.—In the production of imitation coral, ivory, wood, horn, and the like from celluloid, and in the production of reliefs in celluloid, an impression is obtained by a photographic process and a relief mould in plaster is made from it. From the relief mould a hollow mould or cast in metal or plaster &c. is made. The hot celluloid is moulded on the metal or plaster cast by means of a press, and is removed and trimmed when cold.

- 4009. Capron, E., Duvivier, L., and Ponsolle, N.** Oct. 29. [*Provisional protection only.*]

Photo-mechanical printing.—For producing typographical etched plates, or reproducing photographs from nature or from copy, a solution of bichromated gelatine is poured in a thin layer upon an unpolished plate of copper, zinc, or plate glass. When cooled it is caused to receive an impression by the action of light behind a photographic plate. The process is then continued as for ordinary printing with fatty ink upon gelatine, employing transfer ink and transfer paper. The image obtained is then to be transferred to a plate of zinc, for example, and bitten in. The grain obtained by means of this process enables a plate suitable for typographic printing to be produced.

- 4027. Pass, E. de, [Elliott, A. H.]** Oct. 30. [*Provisional protection only.*]

Tripod and like stands.—A stand for rock-drill supports consists of an adjustable tripod with telescopic legs, and having the back leg hinged so as to give any required angle.

- 4193. White, J. P.** Nov. 9. [*Provisional protection only.*]

Head rests.—A horizontal bar is fixed near the floor. Projecting at right-angles from this is a telescopic bar or arm, which slides along the horizontal bar, or may be turned round on it, and is secured in any position by pinching screws or similar appliances. The free end of this arm is fitted as a head rest. There may be another support working on the arm, and two or more arms may be employed for photographing a group.

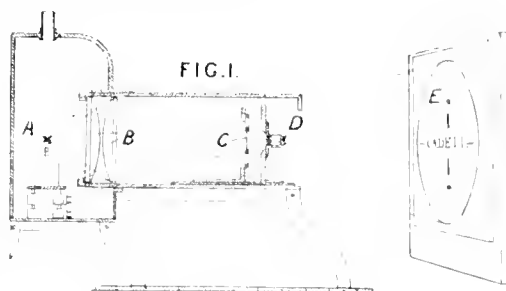
- 4316. Hildebrandt, J. A. R., [Pelzer, F.]** Nov. 17. [*Provisional protection only.*]

Tripod and like stands.—In a stand for rock drill supports, the drill spindles rest in a saddle, or in eyes on two bridges connected by a bar prolonged to form a leg. The other legs, which are telescopic and adjustable, are split and pivoted to a pin on a plate having a quadrant slot in which a bolt on the leg is adjusted by a nut. The pivots and the quadrant plates form a universal joint.

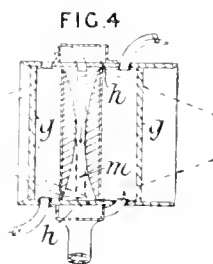
- 4367. Warlich, F. H., and Cadett, J. W. T.** Nov. 21.

Enlarging.—In a method of producing enlarged photographs by the agency of sunlight, or an electric or other artificial light, the rays from the source of light A, Fig. 1, are passed successively through a

condenser B or condensers, a positive or negative photograph C, and a lens D so as to produce an enlarged photograph E. The condensers are kept cool by the passage of water or other liquid through



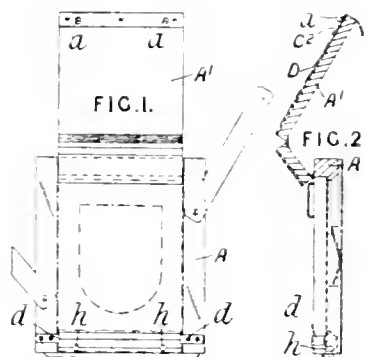
the hollow portions of the condensers, the flow of liquid being made continuous or intermittent by means of an arrangement of pipes. When solid glass condensers are used, glass troughs or similar receptacles containing a transparent liquid are interposed between the source of light and the condensers, or the liquid is passed through receptacles *g*, Fig. 4, formed between the outer faces of the condensing lenses and glass plates, and also through spaces *m* between the lenses when more than one condensing lens is employed. The liquid may also flow through a hollow chamber *h* in order to keep the framework and the parts holding the lenses cool. When an arc lamp is employed, a lens is interposed in the path of the rays so as to focus them between springs or other devices. The focussed rays impinge on one or other of the springs when the light rises or falls, and by heating the spring complete the circuit through one or other of two electromagnets, which by releasing detents from clockwork causes the carbon points to be brought central with the condenser.



- 4380. Hemery, T. G.** Nov. 21.

Printing; vignetting.—Relates to photographic printing-frames used in producing ornamental borders, marginal tints, combination backgrounds, &c. by successive printings. The frame used in printing the body of the photograph is provided with register pins *a*, Figs. 1 and 2, on the hinged back A¹, and with corresponding holes *h* on the body A. The pins *a* are formed with flat ends having sharp edges in order that the sensitive paper may be perforated with holes corresponding to the pins. A metal register plate C² carrying a paper mask D is placed in the printing-frame and pushed down until caught by the springs *d*, after which the negative and sensitive paper are placed behind it and

the frame closed as usual to print the subject. The sensitive paper is afterwards placed in a second frame or "tinter" behind a glass plate carrying a central mask and the design for the border &c.

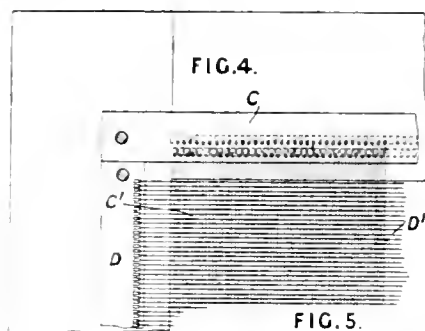


This second frame has the register pins on the body and the holes in the lid in order to facilitate the placing of the sensitive paper in position. When attaching the mask D to the plate C², the glass plate with the central mask is placed in the second frame and the plate C² then placed on the register pins over it so that the mask D may be accurately set in position. In a modification of the printing-frame the pins *a* work through holes in the lid and are attached to a spring on the lid, so that they are withdrawn out of the way after the sensitive paper has been perforated. According to the Provisional Specification, slides fitted adjustably in grooves in the faces of the printing and "tinting" frames are employed for vignetting. The opening of the vignetter and the corresponding disc or mask are scalloped &c. at the edges. The opening vignettes the print towards the edge and the disc vignettes it towards the centre in an inverse ratio so that there is no line of demarcation between the printings.

4600. Richardson, W., and Slack, J.
Dec. 5.

Producing weaving and like diagrams.—A design to be draughted for use in the manufacture of lace, woven fabrics, or looped fabrics is photographed to a reduced scale, and an enlargement is then made from the negative so obtained. An open frame with horizontal and vertical wires stretched upon it is placed in front of the paper on which the enlargement is to be made so that lines representing the threads of the lace &c. are printed upon the paper with the design. Stencil plates representing any arrangement of spots, sprigs, net, ground, or mesh are also attached to the frame in order to produce the spots &c. on the enlarged print. The frames upon which the wires are stretched are made of wood and are provided with perforated steel bars C, D, Fig. 4, upon which the wires C' and D' are secured. Thick wires are used at equal intervals across the frame. In order to hold the stencil plates in position, two or more narrow bars

of steel are inserted into slots in the upper and lower edges of the frame behind the thick wires. The narrow bars are each built up of one bar, perforated down one edge, and of two narrower



bars which are riveted or soldered one on each side of the first bar. The stencil plates shown in Fig. 5 are formed with projections *p* which engage in the holes in the narrow bars of the frame in order to hold

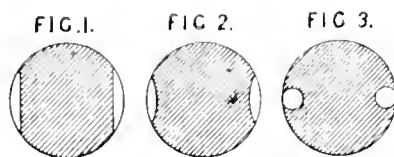
the plates in any desired position. Parts of the print which cannot conveniently be formed with the spots or ground by printing are finished by hand after the print has been developed. Instead of using one frame with horizontal and vertical wires, two frames carrying the sets of wires separately may be employed, and the sides may then be adjusted to set the wires at any inclination or at various distances apart.

4632. Johnson, J. H., [Soc. Henri Pellet et Cie.]. Dec. 6.

Copying drawings and the like.—Relates to a Prussian-blue process for copying drawings, patterns, &c., on paper, wood, fabrics, metal, porcelain, &c. The material is coated with an iron salt, an organic acid, and a gummy substance, such as dextrin, gelatine, gum, isinglass, albumen, glycerine, &c., and, after exposure to light under the tracing or the like, is developed with potassium ferrocyanide and washed with dilute acids and water. The lines of the tracing then appear in blue on a white ground. In erasing lines an acid solution of potassium oxalate is used. If a hue is traced over with a mixture of this solution and a colouring matter, the blue disappears and the colour takes its place. Proportions are given for solutions of perchloride of iron with citric, oxalic, or tartaric acid, or with alkaline citrates, or for solutions of citrate of iron or of iron and ammonia. The material to be printed on may be first treated with an iron salt and an alkali and afterwards with a mixture of citric or oxalic acid and gum or the like.

4877. Lehmann, C. H. Dec. 22.

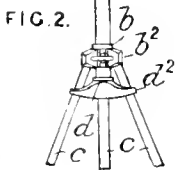
Producing photographs of special character; lens fittings.—The lens is fitted with a screen in which there are two openings, placed about the same distance apart as the human eyes. Figs. 1, 2, and 3 show screens with different forms of opening. The picture produced by this means is similar to the appearance of the subject when viewed with both eyes.



A.D. 1878.

20. Ward, J. Jan. 1.

Tripod and like stands.—Consists of a tube with a sliding collar b , having three or more radially slotted arms b^2 , in which are jointed the upper flattened ends of the rods c . At the bottom of the tube is fixed a plate d , having arms d^2 corresponding to those on the collar b . The arms d^2 are bored with slanting holes, in which the rods c slide, the holes being further from the centre than the joints of the rods. By sliding the collar b upwards on the tube the stand is collapsed.



finally attached to the back of the second plate. Flat glass plates are used in some cases.

446. Weyde, H. Vander. Feb. 2. [*Letters Patent void for want of Final Specification.*]

Lighting-arrangements.—The electric or other source of light used for illuminating objects to be photographed is placed at the focus of a large parabolic or other concave reflector so that the object is illuminated by parallel rays of reflected light. A small shield or screen of opaque or semi-translucent material is placed directly in front of the source of light to prevent the direct rays from reaching the object. The side of the shield nearer to the source of light may be polished and of flat or concave &c. form to reflect the direct rays back to the parabolic reflector.

176. Dale, G. Jan. 11. [*Provisional protection only.*]

Colouring.—An ordinary print on paper is mounted face downwards upon a convex glass plate by means of starch &c., and, after drying, is rendered transparent by laying it in a bath of castor or linseed oil. The finer parts are then coloured over with pure oil colours without medium or varnish, after which a second convex glass plate is placed over the back. The heavier masses of colour required are painted on this plate, and the plates are then fused or otherwise hermetically joined at the edges. A white or tinted card is

481. Newton, H. R. Feb. 5.

Colouring; mounting prints.—In a method for colouring photographs, the prints are first rendered transparent and, after colouring, are mounted on various other materials which have also been rendered transparent or semi-transparent. The photographs and other materials to be rendered transparent are cleaned from size &c. by immersion in chloride of lime or other solutions and then washing in clean water. They are then immersed in warm Canada balsam &c., and drawn out

between rollers or plates to remove excess of liquid. The remaining incrustation may be removed in places if desired by means of benzene &c. in order to obtain the required degree of transparency. The smaller or more delicate parts of the photograph being treated are then coloured on the back or front, the ground or main parts being left undisturbed. The lower part of the base on which the photograph is mounted consists of a layer of pure white gelatine, glazed paper, or other smooth material which is covered with one or more layers of silk gauze, attached by means of Canada balsam; one or more layers of linen are then attached to the silk to complete the base. The upper part of the base consists of layers of coloured paper or silk with or without a layer of linen, these layers being cut with lines representing the principal lines of the photograph. A stencil obtained by tracing the principal lines on a sheet of stiff gelatine and afterwards cutting them through, is used to facilitate the cutting of the layers of paper &c. The lower base is coloured to represent the ground of the photograph, and the front of the upper base may also be coloured, the colours being mixed with isinglass or size. When the photograph and base have been secured to each other, a piece of cloth is attached to the back and turned over on to the front at the edges, the whole being then varnished. A metal card, or other frame may be inserted between the photograph and base to lift the photograph from the base, or the photograph may be placed between two pieces of thin plate glass, the base being then attached to the back as before. The materials used to form the base may be polished or have a rough surface. The materials forming the base may be mounted on or between sheets of glass, opal, enamel, japan, vulcanite, china, earthenware, gelatine, paper, cardboard, or painted wood or ivory.

Printing.—The sensitized paper used for printing photographs is mounted on vulcanite or other suitable frames before it is coated with the sensitive material, so that thin paper may be employed and the printing &c operations may be carried out without touching it by hand.

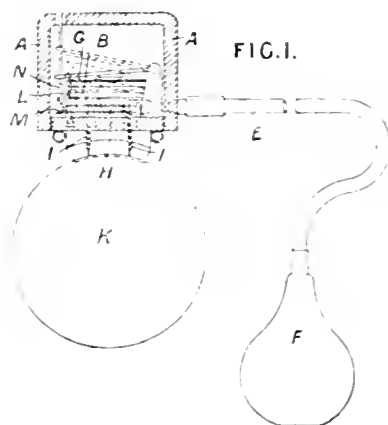
906 Prager, A. March 6.

Mounting prints; colouring.—After printing, the albuminous film is stripped from the paper and transferred, face downwards, to a glass table. Oil colours are then applied to the back and, after drying, the film is transferred to an artist's canvas, wood panel, or varnished metal plate. The picture is finished by pressing it between heated metal plates.

1037. Cadett, J. W. T. March 19.

Shutters.—In a pneumatic arrangement for uncapping the lens of a camera, the shutter K is attached to the arms I of the spindle G, and another arm M attached to the spindle is connected by the link L to a bar which rests on the bellows B, which is connected by the flexible tube E to the flexible chamber F. The shutter may be kept in

its closed position by means of a spring H, and the apparatus may be enclosed in a case A or fitted inside the camera. For focussing purposes, the



shutter is locked in its open position by means of the lever N which engages with the bar resting on the bellows B.

1407. Wayte, C., and Herzog, C. April 9. [Processional protection only.]

Negatives, producing by mounting paper designs &c. on glass &c.—Paper types in the form of transparent designs surrounded by an opaque ground are mounted on glass or other material to produce substitutes for ordinary photographic negatives, for photo-lithographic printing and other purposes. The paper types may be used in correcting ordinary negatives.

1442. Alder, G. E., and Clarke, J. A. April 11.

Lighting-arrangements; lamps, actinic; lamp reflectors.—Objects are illuminated for photographic and other purposes by actinic light such as electric, magnesium, or pyrotechnic, in the following manner:—The light is placed at the focus of a large mirror, which is composed of a number of small reflectors fixed in a metal frame, and the reflected rays are passed through one or more screens of opal, ground glass, "papier mineral," or other semi-transparent medium, to disperse the light. When a pyrotechnic or magnesium light is used, the lantern must be fitted with a chimney to carry away the fumes. The light may be subdued by passing it through violet or blue glass.

1448. Rouch, S. W. April 11.

Cameras.—A portable camera consists of a bellows body with a folding baseboard, which folds up when out of use to protect the ground glass. The bottom of the back part of the camera is bevelled so as to provide for a vertical swing,

the back being fixed by a pinching-screw working in a slot. The front of the camera is carried by a central piece which slides in a narrow frame, preferably by rack and pinion, the back end of which frame may be attached at one of several places on the baseboard, to suit lenses of various focal lengths. By making this attachment with a pinching-screw, the front of the camera carrying the lens can be set at such an angle as to be equivalent to a lateral swing of the back.

1458. Garthwaite, W. April 12. [*Provisional protection not allowed.*]

Producing wearing and like diagrams; enlarging; reducing.—A design for a lace, net, or other woven fabric is reproduced by printing through the design on a photographically-prepared surface, guide lines being also produced by means of cotton, silk, wool, or other threads or wire stretched on a frame or woven together and placed on or under the design during printing. For enlarging or reducing the design, a negative is first made and guide lines produced by means of threads or wires placed between the negative and prepared surface. Or, after printing from the negative and before development, the positive may be again exposed through a darkened glass on which clear lines have been scratched. Metal, wood, paper, &c. with guide lines pierced through, may be used instead of the darkened glass. The design may be photographed on suitably prepared paper, cloth, &c. with the lines formed on it.

1493. Tydeman, E. M. T. April 15. [*Provisional protection only.*]

Lenses.—Compound lenses are made of one kind of glass but of two or more qualities having different densities and refractive indexes, instead of different kinds of glass, in order to reduce the secondary spectra. Flint glass is preferred.

1502. Guttenberg, M. April 15.

Photo-mechanical printing; printing-paper; mounting films; printing.—Relates to a method of producing stippled tints, backgrounds, and vignettes in photographic prints to make them resemble drawings or engravings. The albuminized, salted, or gelatinized paper, on to which the photograph is to be transferred or printed as usual, or the paper before being albuminized &c., is printed with ink or colour from an engraved plate or lithographic stone to produce a uniform or graduated stipple or a vignette, landscape, interior, or other background. The stippled tint may be printed separately from the other part of the background, which may be produced by crayon drawing on the stone, and different portions of the stippled tint in different colours may be applied to parts of the picture, a separate plate or stone being used for each colour. The carbon film, in the case of a

carbon photograph, is then transferred to the paper treated as above. The carbon film should be printed from a negative taken on a light background, or if taken in a dark background, the background in the negative must be blocked out. In the case of silver prints, the paper treated as described is sensitized and printed from the negative.

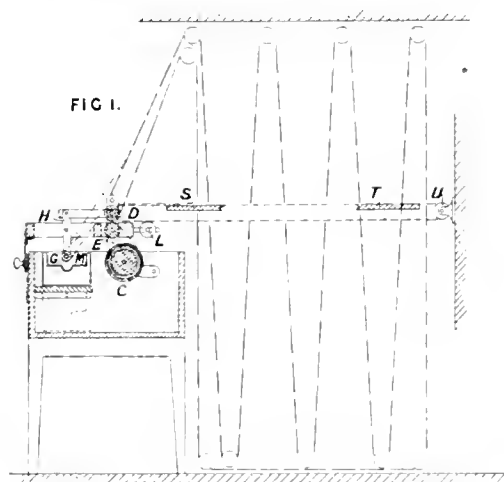
1646. Brassinne, H. April 24. [*Provisional protection not allowed.*]

Finishing; mounting prints.—In finishing photographic portraits, hair or other equivalent material of the required colour is worked up to any desired pattern or shape, and is sewn, glued, or otherwise attached to the print to represent the hair, beard, eyelashes, or eyebrows of the sitter. When the photograph is mounted on a fabric, the hair is worked into it as in embroidering. Photographs of this kind are protected by suitable frames or medallions.

1799. Michaud, A. May 17.

Photo-mechanical printing; chromo-gelatine processes; producing photographs of special character.—Relates to chromo-gelatine processes of producing printing-surfaces and moulds or casts for making jewellery &c. To produce a grain on proofs from a chromated gelatine plate, taken from a negative obtained from nature or a work of art, a sheet of sensitized carbon tissue is placed over a glass plate on which is uniformly dusted an opaque powder. The negative is coated with gum containing a trace of chromate and the sheet of carbon tissue is applied to it under water, and developed in warm water, which removes the gelatine unaffected by light. The insoluble parts adhere to the negative and produce the required grain. To obtain a cast from a gelatine relief, it is, after development, dried in the open air, then supported on glass rods over moist blotting-paper in a case till slightly swollen, and is then lightly coated with fine plumbago by a fine brush. The film thus prepared is mounted on a metal plate, and pressed on to a melted fusible alloy until hard. The casting thus produced may be used for the production of lithographic transfers, as a printing-block, or in the electrolytic production of moulds for the manufacture of jewellery or of copper printing-plates. To obtain signboards, door plates, &c., a brass plate is coated with bitumen, exposed, developed, &c. as usual, then immersed in a galvanic bath. The unaffected bitumen is cleaned off, and the plate immersed in a solution of ammoniacal carbonate of copper; or if the inscription requires to be deepened, the plate is first placed for a few minutes in an acidulated solution of a copper salt before being treated with the ammoniacal salt.

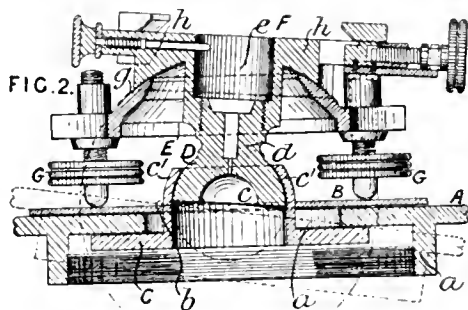
2007. Sarony, O., and Johnson, J. R.
May 18.



Sensitized films; chromo-gelatine processes.—Relates to apparatus for coating paper with gelatinous matter, combined with carbon and other pigments, to make carbon tissue or pigment paper for use in photography. The paper to be coated is carried on a stock-roller C from which it is drawn by a pair of feeding-rollers D, E. The feeding-rollers may be actuated by a tangent screw worked by hand, by power, or by a falling weight, and regulated by a flywheel. The paper passes from the feeding rollers under the dipping-roller G by means of which it passes through the melted coating-material in a vessel M kept warm by a hot-water jacket. The roller G hangs from two swinging arms H, and the arms and roller are counterpoised by a weight L so that the roller floats on the gelatinous liquid, adjusting itself to the surface. Or the roller G with its frame may be lowered mechanically and retained by a catch, to allow of its instant removal from the coating material. The above apparatus may be packed in the box in which it works. The end of the paper from the roller G is fastened to a lath, and by it led by cords over the upper feeding-roller D, then over a hot-plate S to liquefy the coating, and then on to a level table T. The cords pass round the roller D and over pulleys U attached to the opposite wall of the room. When the coated paper has reached the far end of the table T, it is cut between the table and the hot-plate, and allowed a few minutes to set, and then hung up to dry. The melting and levelling of the coating is dispensed with if tissue of only ordinary quality is required. For small consumers of pigment paper, the coating may be done by small cylinders of oiled or varnished paper with ends of cork or light wood to carry the pivots. The bath containing the coating-material has a plate at each end of it with slots for the pivots of the rollers to turn in. A length of the paper is rolled upon a roller and has a lath at its free end, so that when placed in the bath, it

may be drawn off by the lath until the roller is itself raised out of the bath.

2084. Davis, A., [Hoffman, D.]. May 24.



Tripod stands.—Relates to heads of stands for transits, levels, theodolites, &c., and consists of a base-plate A having a central opening a, and a carrier plate B with an aperture b of less diameter, into which the neck e of the socket-plate C fits accurately. The ball D, working in the concave bearing c, and forming the lower ball-and-socket joint, is connected by a screw-threaded end d with the neck e of the instrument plate F. The upper spherical bearing is formed by the convex annulus g on the levelling-screw plate E and the socket h on the plate F. The bearings c, D, g, h are concentric. The loosening of any two of the levelling-screws G lets down the socket-plate C, and allows the carrier-plate B to be shifted horizontally until the centre of the instrument is adjusted over the desired spot. By setting up the levelling-screws the instrument may be accurately levelled, at the same time binding the ball-and-socket joints together.

2174. Harman, A. May 30. [*Provisional protection only.*]

Enlarging; re-touching; finishing; printing.—In producing an enlarged photographic print from a negative, the negative is coated with matt varnish on the back so that any modification of the lights and shades may be produced thereon by re-touching with plumbago &c. The sensitive paper is exposed under a stipple negative, either before or after printing the picture, in order to give the finished print the appearance of being finished by hand. Several stipple negatives of different grains may be employed, the requisite parts being blocked out by hand on the stipple negatives before exposure to the light. The print may also be re-touched by hand.

2473. Gurney, J. June 21.

Transparencies; colouring.—To render photographic prints transparent and durable and to

facilitate colouring, they are first stretched on frames, saturated with melted paraffin, and moistened on both sides with petroleum or other suitable hydrocarbon. They are then immersed in a solution of gelatine and afterwards placed face downwards on a glass plate coated with collodion. After pressing the prints, they are dried as in the

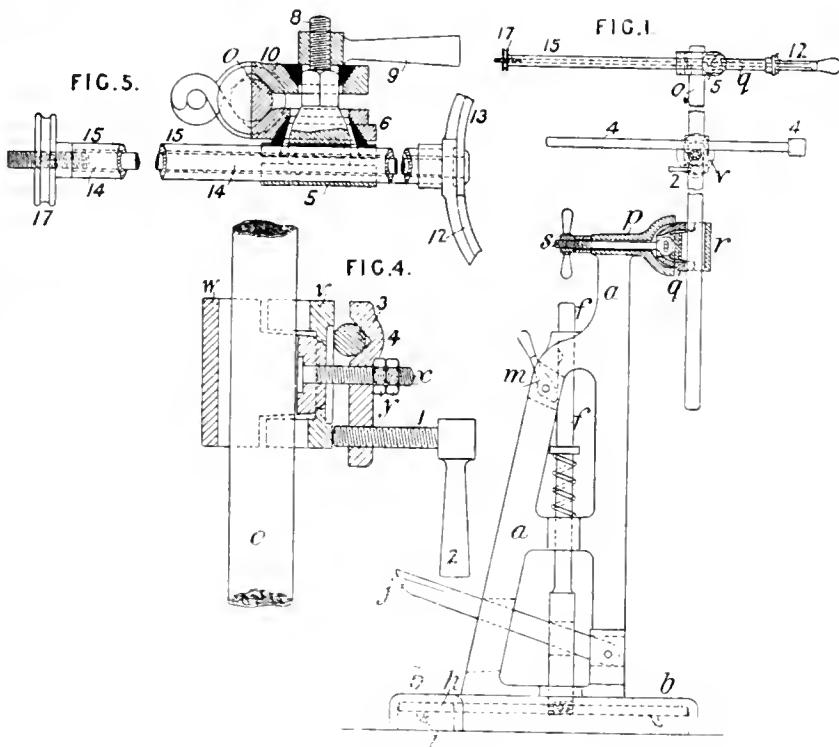
ordinary enamelling process, and are finally detached and coated on either or both sides with varnish consisting of equal parts of collodion and an alcoholic solution of shellac. The prints may have been coloured previously to their treatment by the above process, but are preferably coloured on their backs while attached to the glass plate.

2544. Emmerson, E. E. June 25.

Head-rests.—

A photographers' head and body rest is constructed so that it may be readily wheeled about and its parts adjusted. A standard *a* fixed on a hollow base-plate *b* carries a vertical shaft *f*, to which is attached a plate *h* fitted within the hollow base-plate and provided with castors *i*. The plate can be depressed by a lever *j* to bring the castors in contact with the ground and enable the apparatus to be wheeled about. A pivoted catch *m* may engage notches in the shaft *f* to keep the plate in its depressed position. The rod *o* carrying the back-rest *4* and head rest *12, 15*, is adjustably carried in a clamp

at the top of the standard *a*, which clamp is formed of a fixed cup *p*, loose cup *q*, and clamping-piece *r* attached to a tightening-screw *s*. The back-rest *4* is adjustably carried by a double clamp formed of the two pieces *v, w* embracing the rod *o*, and the grooved plate *3* embracing the rod *4*; the screw *x* and nuts *y* hold the parts together and they are clamped on to the rods by the screw *1, 2*. The head-rest is adjustably carried by a double clamp formed of the parts *5, 6*, and *10* clamped on the rods *o, 15* by the screw *8* and nut *9*. One of the arms *13* of the head-rest *12* may be pivoted to a rod *14* which passes through the hollow rod *15* and is clamped by the nut *17*, thus enabling the arm to be opened or closed or placed in any desired position.



opened and closed by an electromagnet. The cup or an opaque shield is carried inside the camera on a lever which is connected with an electromagnet, so that, on making or breaking an electric circuit by means of a contact maker in the form of an insulated rope, the exposure is made. The disc may be made in one or more pieces to open and close like a flap, or a sliding shutter, or a semaphore disc, or a guillotine. With this apparatus the sitter can make the exposure.

2331. Sarony, O., and Johnson, J. R. July 1.

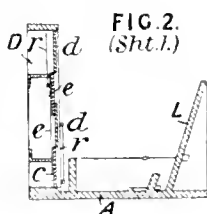
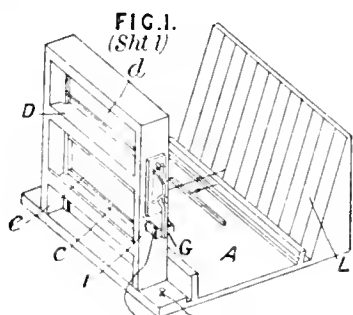
Chromo-gelatine processes; sensitized films.—Relates to the manufacture of a compound to be used in the preparation of carbon tissue for photographic printing, by the carbon process. To obtain a medium for the preparation of the compound, part of a concentrated solution of gelatine is evaporated to dryness in a water bath to ascertain the proportion of solid gelatine. Another portion of the

2608. Cussons, D. H., and Cowan, A. June 29. [*Provisional protection only.*]

Shutters.—In order to prevent the attention of the sitter from being attracted by the act of exposing, the shutter of a camera is arranged to be

solution is poured upon glass, and the film obtained is washed, liquefied, and evaporated to dryness to ascertain the proportion of solid matter. Sugar is added to the concentrated solution in such a quantity that the soluble portion, plus the sugar, may be one half by weight of the insoluble gelatine, and the product is used as the medium. To one portion of the medium Indian ink is added which has been softened and diffused through water. To another portion is added Indian ink and alizarine lake prepared as described in Specification No. 1367, A.D. 1877, and a small quantity of carbolic acid to obtain a purple tinted compound, which is slabbed, dried, and cut up like ordinary gelatine. A standard gelatine without colour is prepared for diluting the compound.

2746. Morgan-Brown, W., [Muybridge, E.].
July 9.



Shutters; backgrounds.—Relates to apparatus for taking instantaneous photographs of objects in motion and more especially adapted for photographing rapidly-moving horses. The track A, along which the horse is moving, is provided with a white background L, marked with vertical and horizontal lines, and with a shutter for exposing the plate in the camera as the horse passes. The shutter consists of two parts *c*, *d*, which are drawn vertically in opposite directions by springs *r* and are provided with holes *e* equal in diameter to the lens in the camera. When the parts *c*, *d* are drawn up and down to extend their springs, they are held by a single lever catch on the frame D. The lever is operated by a trigger attached to the armature G of an electromagnet I, the electric circuit through the coils of which is broken by a pair of springs attached to the back of the background L. A thread stretched across the track A at a suitable height is connected to the outer spring, which is therefore pulled against the other one when the horse runs against the thread. The electromagnet

circuit being thus completed, a current flows round it from the battery and the armature G is moved so as to release the trigger and lever-catch. The plate in the camera is thus exposed for an instant as the holes *e* overlap. When photographs of a trotting-horse in a vehicle are to be taken, one of the wheels of the vehicle is arranged to pass over and pull the thread attached to the spring. Several cameras with independent electric circuits may be used to obtain several photographs in quick succession.

2800. Willis, W. July 12.

Developing.—Relates to a modification in the platinum &c. printing processes described in Specification No. 2011, A.D. 1873, and consists in adding to the oxalate developing-solution a salt of platinum, iridium, or mercury, but preferably potassium chloro-platinate. Platinic chloride, potassium chloro-platinate, or sodium, ammonium, or barium chloro-platinate, or iridium chloride or mercuric chloride may be added to the developing-solution.

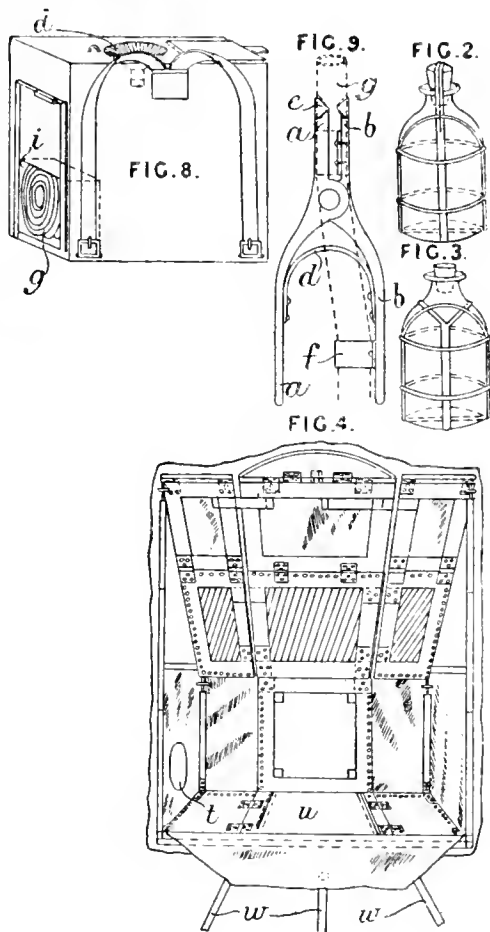
Printing paper.—The coating-solution for treating the printing-paper &c. previous to its exposure to light may be modified by substituting iridium chloride for the potassium chloro-platinate, or plumbic chloride may be substituted for the mercuric chloride, or other salts of gold, iridium, or palladium may be used. The salts may be applied in successive solutions.

2912. Woodbury, W. B. July 22.

Producing transparencies and photographs of special character; chromo-gelatine processes; sensitized plates and films; printing.—In the production of landscapes, portraits, or designs upon paper, cloth, or other material, the design is first produced in relief, by the aid of photography, upon a sheet of hard material, and this sheet and the paper or cloth are passed together between pressure rollers or under a stamping-press. The parts of the paper or cloth in contact with the relief parts of the photographic sheet are thus compressed so that, when viewed by transmitted light, they are more transparent, and when viewed by reflected light are darker, than the other parts. A sheet of paper is coated with a solution of gelatine to which a little opaque pigment is added. After drying, the gelatine film is rendered sensitive by treatment with a solution of potassium or ammonium bichromate, dried, placed under a transparent negative or a positive photographic picture, and exposed to light. The gelatine film is next fixed to a plate of metal, preferably steel coated with nickel and then with collodion, by pressing them together under water, and the paper backing of the film is washed away, and those parts of the gelatine which have not been affected by the light are dissolved. The remaining gelatine is dried, preferably by immersing in alcohol. In a modification, the metal plate may be replaced by a flexible sheet made by pouring gelatine, rendered insoluble by the addition of chrome alum, on to a sheet of glass, or by coating a sheet of paper on one side with a solution of

gelatine and on the other with a solution of shellac in water containing borax. The design in relief thus produced on the metal plate or flexible sheet is laid against the sheet of paper or cloth to receive the design and the two are passed together between pressure rolls or placed under a stamping-press.

3184. Tiator, J. Aug. 12.



Cameras; dark rooms; chemicals, storing.—A portable photographic apparatus when packed up resembles a hand trunk. The part which forms the camera carries the water reservoir, Fig. 8, which, when filled through the opening *d*, is supported on the operator's back like a knapsack. The flexible tube *g*, which is packed away in the recess *i*, is provided with a pinch-cock, Fig. 9. The levers *a, b* are actuated by the spring *d* and have projections *e* which compress the tube *g*. The tube passes through guides *f*. The other part of the trunk carries the bottles for chemicals and other apparatus required, and when opened out, as shown in Fig. 4, forms the dark room. The bottles are surrounded with horizontal and vertical rubber

bands. The vertical bands are divided and the parts can be raised to secure the stopper, as shown in Fig. 2, or can be allowed to rest on the neck, as shown in Fig. 3. A portion of the dark room, Fig. 4, is covered with yellow silk, to admit light; the remainder is covered with black cloth which extends over the head of the operator. Elastic holds the cloth tightly over the operator's body. The right hand is admitted with the body, while the left hand enters the chamber through the hole *h*. For focussing, the front of the camera is moved by a screw from behind. The space between the moving parts is filled with plush, to exclude light. For further security, an additional cloth covering is provided, which is nailed to the camera and pulled up by a cord. The lens is carried separately in a leather case. A developing or washing tray is formed in the bottom of the camera by waterproof material, when the slide *u* is drawn forwards.

Camera stands.—The apparatus is supported on legs *w* which, when taken off, can be placed together so as to form an iron pipe resembling a walking-stick, a handle being screwed on to one end and a ferrule on to the other.

Plate boxes.—The plates are carried home for varnishing in a box in which they are kept apart by pieces of vellum with triangular bits of woollen rag at each corner. The box has holes for allowing the escape of moisture.

3196. Lombardi, A. Aug. 13.

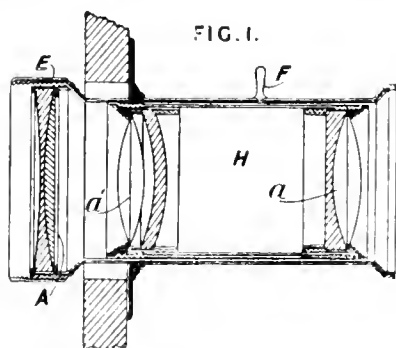
Colouring.—Photographs to be coloured are produced on a fabric which is first treated with a solution of a fixed oil, such as castor oil, and pyroxylin in methyl alcohol in order to render it translucent. This treatment of the fabric is followed by treatment with a solution of gelatine, containing chrome alum to render it insoluble, and a white pigment, such as kaolin or zinc oxide, to fill up the meshes of the fabric with an insoluble transparent material. The photographs are produced on the fabric by the dusting-on process, the carbon process, the use of haloid silver salts, the platinotype process, or by mechanical processes; the pictures may be produced also by coating the fabric with asphaltum, exposing it in a printing-frame, and removing the unaltered material by a suitable solvent. The pigments used to colour the photograph are applied to the back of the fabric. The fabric may also be coloured by hand or mechanically before the carbon or other prints are transferred to it.

3243. Goodwin, H. Aug. 16.

Photo-mechanical printing.—In a photo-mechanical method of printing copies of musical compositions and other works, a form is set up with all the characters in place, and is photographed. A metal plate coated with gelatine and sensitized with a chromate is exposed under the negative. After exposure the plate is covered with a fatty ink, developed with hot water, and bitten in with acids as usual. The plate may then be used for

printing, or an electrotype copy may be obtained from it. The form consists of a background made up of convenient horizontal sections each of which has wires stretched across it from end to end; the wires and the background are painted white with the exception of alternate wires where required to represent musical staves. The notes, signs, words, &c. are cast or stamped, or cut out of metal or wood, painted black on their fronts, and are provided with two flanges at the back to attach them to the wires. If required the black and white may be reversed, the background black and the type white, the staves being painted out, or made by letting in strips of white material; the notes, signs, &c. in this case have only one flange which fits into grooves cut in the background.

- 3465. Morgan-Brown, W.,** [*Knapp, J. A., Kamping, F. W., and Spring, R. Y.*] Sept. 2.

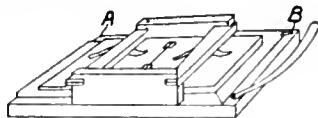


Lenses and lens fittings.—A combination of lenses for producing a flat field and for correcting spherical aberration and distortion consists of an achromatic plano-concave lens A placed in front of the ordinary lens a' or behind the lens a' , and secured to a thimble E, which can be detached so that either side of the lens A may face the object. A negative meniscus or bi-concave lens, or a simple plano-concave lens, may be used instead of the compound lens A. The inner sliding tube H is provided with a handle F working in a curved slot in the outer tube to facilitate focussing.

- 3828. Stephenson, G.** Sept. 28.

Producing photographs of special character.—Relates to the production of medallions, designs, or patterns for photographers and others. A design is made on a thick card or any soft metal by cutting partially through it with a specially made knife, the cuts being oblique, and the edge of the material being raised by the cutting operation. A negative is then taken of the prepared plate, the prints from the negative having the effect of a design in light and shade.

- 3941. Lane, J. T.** Oct. 7. [*Provisional protection only.*]



Printing; masks; producing composite photographs.—The printing-frame has a raised ledge at end A, against which the sensitive paper, masks, &c., are placed to secure correct register. At the other end of the frame there is a long flat spring B, or other device to hold the masks &c. down. Each frame has an actinometer attached. For combination printing, a part of a print is cut out, the figure of a portrait from its background for instance. The figure is fixed on a transparent medium which is mounted over an opening in a sheet of paper or the like. This sheet of paper and that forming the background are placed together in register under the spring B, and are used as masks successively during the printing. By this process figures and backgrounds, letter-press, &c. can be added to negatives as required.

- 4023. Germeull - Bonnaud, J. B.** Oct. 11.

Colouring; printing.—The paper is first sensitized with a solution of silver nitrate and glycerine, and is printed on sufficiently to give the outlines of the picture. The print is developed, dried, and coloured in flat tints. The colours are mixed with a solution of gum arabic and glycerine. After drying the print is albumenized and re-sensitized. It is then printed again till the half tones are brought out, being finally developed and fixed by the usual processes. When a number of copies are required, the outlines may be lithographed and the colours produced by chromo-lithography.

- 4032. Nawrocki, G. W. von,** [*Stegemann, A.*] Oct. 12. [*Provisional protection only.*]

Shutters.—In an instantaneous shutter for photographic cameras, one or more plates or discs of metal or other material are arranged to move vertically, horizontally, or round a point. They are held in position over the object glass by a spring or other appliance, and are drawn aside by a string or otherwise.

- 4062. Tydeman, E. M. T.** Oct. 14. [*Provisional protection only.*]

Lenses.—Achromatic lenses suitable for cameras are made of only one kind of glass, such as flint glass, the elements of the combination having different densities and refractive indices.

4146. Bolhoevener, C., and Heidenhaus, E. Oct. 18. [*Provisional protection only.*]

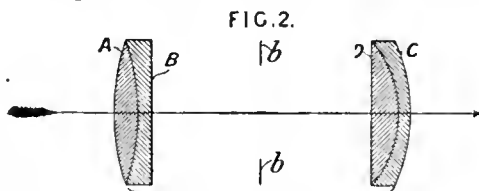
Photo-mechanical printing.—Relates to the manufacture of plates or blocks for printing or engraving. A solution of Cologne glue and bichromate of potash is poured on to plate glass previously covered with ox-gall. After being dried in the dark, the layer is detached, printed on the side that was next the glass by a negative, and glued by the other side to a polished block of wood or other substance. The parts that have been protected from the light are then removed by rubbing with a ball of moistened cloth.

4671. Scott, W. L. Nov. 18. *Drawings to Specification.*

Lamps.—An electric lamp for photographic purposes is made to give a coloured light by supplying to the electrodes, or mixing with the substance thereof, suitable metals or compounds. The electrodes are made of lime or other suitable metallic oxides or mixtures thereof and are coated or impregnated with metals, graphite, carbon, or other conducting-materials, or the lamp may consist of a block of lime &c. placed between or against metal wires, points or surfaces from which

"electric light, sparks, or incandescence does or can radiate."

4756. Nawrocki, G. W. von, [Voigtländer F. von]. Nov. 22.

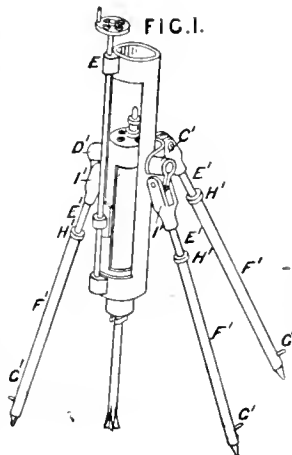


Lenses.—A compound photographic lens consists of two double object glasses between which is inserted a central stop or screen *b*. The front double object glass consists of a double convex lens A of crown glass cemented by Canada balsam to a double concave lens B of flint glass, one surface of which is only slightly concave. The back double object glass consists of a plano-convex lens D of crown glass cemented to a diverging meniscus C of flint glass, the plane face being placed towards the front object glass. The focal lengths of the two double object glasses are equal, and the outside surfaces of the two glasses are of the same curvature. The radii of curvature of the surfaces of the different lenses are stated.

A.D. 1879.

104. Richmann, H., and Arnold, U. K. Jan. 10.

Tripod and like stands described particularly with regard to stands for rock drills. The body of the stand is formed in two parts secured by screws which pass through the clamps C', D', and attach the forked ends I' of the legs thereto. The lower parts F' of the legs are tubular, and are



adjusted and locked by lock-nuts H' on screw threads on the upper parts E'. They are pointed below and have lugs G' for steadying-weights.

295. Salvy, E. Jan. 24.

Sensitized plates and films; chromo-gelatine processes.—Relates to "the vitrification of gelatinous impressions obtained either by photography, or from copper and steel plates," which are applicable for the ornamentation of crystal, glass, stoneware, porcelain, and enamel. The gelatine is coloured with a vitrifiable oxide to which is added a flux. This mixture may be laid on unsized paper and, after drying, sensitized by means of a bath of bichromate; or it may be poured over a mould or engraved plate, and by a special press drawn directly on glass, or on paper from which it can be transferred. The gelatinous print, whether

obtained direct or by transfer, is dried and immersed in a four per cent. solution of permanganate of potash, or a four per cent. solution of nitrate of potash containing sulphate of alumina, tannin, gallic acid, chrome alum, or other substance which renders gelatine insoluble. It is then washed, dried, covered with a thin layer of flux, and baked.

564. Hely, A. A., and Wilmot-Snook, W. Feb. 12. *Drawings to Specification.*

Sensitized plates; fixing.—According to the Provisional Specification an impression of any desired negative may be taken upon a sensitized gilded or silvered plate of glass. The superfluous metallic leaf is washed off, leaving the picture in gold or silver lines on the glass. The picture may be fixed by an enamel composed of copal varnish, any suitable metallic oxide, and linseed oil.

748. Wise, W. L., [Schuhmacher, J., and Stade, G.]. Feb. 24. *[Provisional protection only.]*

Colouring; mounting films; ornamenting by photography.—Relates to the production of coloured pictures on canvas &c. by transferring photographs which have been coloured. The photograph is obtained on chalked paper which is coated with gelatine and a solution of "collodion of silver." The surface of the print is then coated with retouch varnish and pasted with its face on to the canvas &c. The backing-paper is then removed by washing in water. The picture is then varnished. If the material or article on which the picture is pasted is dark coloured, such as a jet-black tray, the coloured side of the photograph is coated with a white colour before the retouch varnish is applied, so that the white colour may form a ground to the finished picture.

807. Wright, F. Feb. 28. *[Provisional protection only.]*

Photometers.—Relates to photometric gas apparatus. A meter, governor, King's gauge, and clock are combined in one apparatus. The clock is actuated by the meter, the motion thus imparted being regulated by a spiral spring working in a barrel.

1033. Kaiser, F., and Duplessy, A. A. March 15.

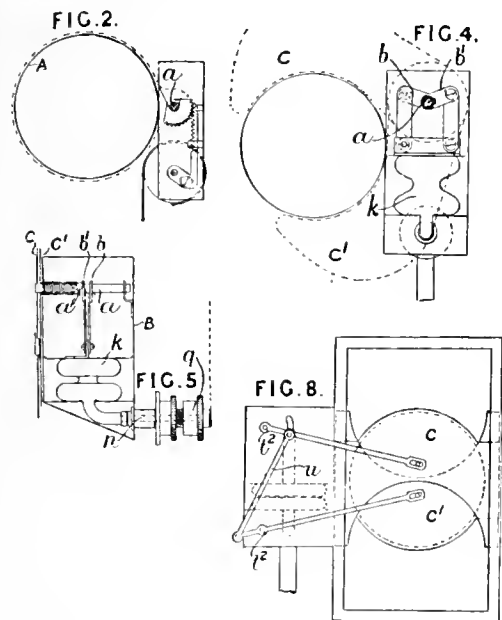
Photo-mechanical printing; copying drawings; sensitized plates and films; printing paper.—Relates to a photographic process for producing on lithographic stones or metal plates pictures or drawings which can then be printed off from the stones or plates either without further treatment or after etching with acid. The process may also be employed for printing photographically directly on

paper or Bristol board or for engraving on glass. The sensitizing-substance employed is termed "Résinaline." It is extracted from Barbadoes tar or other mineral tar or pitch by means of spirit of turpentine or sulphuric ether. The Résinaline is added to a mixture of bitumen, india-rubber or gutta-percha, spirit of turpentine, and carbon bisulphide, copal varnish, or, when a rough grain is required, a solution of uranium nitrate in ether. The bitumen and gutta-percha may be replaced by the residue of coal tar or pitch, paraffin, or wax, or other resinous or fatty matters. The sensitive preparation is applied to the stone, metal, paper, or other surface and is dried in the dark. After exposure under a photographic negative or a drawing on paper, the parts affected by the light become insoluble. The proof is developed by rubbing it over with axunge, hogs' lard, olive oil, petroleum, gasoline, benzine, or turpentine, singly or combined according to the hardness of the film. The proof is then wiped with a clean linen cloth to remove the dissolved matter, and is hardened by exposure to light. Proofs developed upon metal plates may be used for printing without preliminary etching if, before inking, the surface is acidulated with a mixture of gallic acid, gum arabic dissolved in water, and nitric acid. If a proof is to be obtained directly upon paper, the paper is given a thin coating of collodion or gelatine before applying the sensitive preparation in order to prevent it from penetrating the paper. A colouring-substance may be added to the sensitive preparation. If a proof on a metal plate is developed with ether instead of petroleum, the bitumen is dissolved instead of the rubber, and the plate can be etched or engraved for printing in the manner of copper plate or "taillédouce."

1073. Dillon, T. A. March 18. *Drawings to Specification.*

Copying documents; photo-mechanical printing.—Relates to the invention described in Specification No. 1935, A.D. 1874. Printed deeds and the like are photographed in the ordinary way and prints taken on bichromated gelatine. From this a plaster or other cast is taken and a metal stereo-plate prepared from the plaster and impressed on thin metal in the manner described in the earlier Specification; or the gelatine may be dried and used as in the Woodbury-type or in other ways. The copies of the deeds may be preserved in miniature in books or rolls fitted with graphoscopes. For copying a number of documents, these are pinned on a band wound from one roller to another. The camera has a long frame which holds a number of dry plates, and the plates as well as the roll of supported documents are moved by clockwork as required, pausing for each exposure, till the work is done. When an electric light is used it is arranged to work automatically, only when required. Crumpled parchments are moistened with spirits of wine and flattened under glass for photographing, except when aniline ink has been used, when they are hung up in a damp room till limp.

1183. Spurge, J. B., and Whitcher, J.
March 25.



Shutters.—A photographic shutter consists of a disc A, Fig. 2, mounted on a spindle *a* which is partially turned by means of a quadrant and rack connected to an arm on a lower spindle which is turned by a cord and pulley. Or arms on the spindles may be connected by a link instead of the rack and quadrant. In another form, shown in Figs. 4 and 5, two parts C, C' of a shutter are attached respectively to a solid spindle *a* and a hollow spindle *a'*, these spindles being turned in opposite directions by means of arms *b*, *b'* connected to an expansible chamber *k*. Water or air may be forced into the chamber by compressing a rubber bulb connected thereto, a stop-cock being provided on the bulb to maintain the pressure in the chamber and so determine the exposure. Or the arms *b*, *b'* may be actuated by means of cams mounted on the lower spindle and operated by a cord and pulley. In another form, shown in Fig. 8, sliding shutters C, C' are attached to levers pivoted at *t*² and connected by a link *u*, one end of which works in a slot and is actuated by any of the methods described above. The edges of the shutters may be curved so as to open first at the centre or edge as desired.

1207. Dillon, T. A. March 26.

Lamps, actinic.—Special electric lamps in which the current is produced by a compressed-air motor and dynamo may be united or combined with oxy-hydrogen, "pyro-oxygen," magnesium dust, or other actinic light producers to adapt them for use by photographers. Reflectors are fitted to the lamp to reflect the light in any direction and so

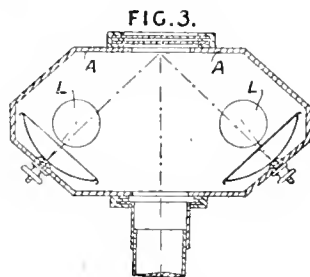
soften the shadows. The exhaust air from the motor may be utilized in a blowpipe to act on a piece of lime; or a portion of the air may be carburetted to form gas for the blowpipe. Or it may be used for blowing magnesium or like dust into the flame. The air-supply may be automatically cut off by clockwork when the lamp is used for copying purposes, thus extinguishing the lamp.

1347. Dillon, T. A. April 4.

Copying documents; photo mechanical printing.—Relates to means for transmitting telegraphically writings, printed, engraved, embossed and photographic matter, in facsimile. The design, sheet of printed matter, &c., is if necessary flattened under glass, and a reduced negative is taken from it. From this negative an enlarged print is obtained by an enlarging apparatus on chromated gelatine, which is soaked in water till the unchanged chromate is removed. The parts unacted on by the light retain moisture, and thus will conduct the electric current; the parts acted on will not conduct the current. The gelatine is then transferred to a metal wheel or cylinder which revolves regularly beneath a style, so that the current flows or ceases to flow according as the conducting part or non-conducting part passes beneath the style. A receiving surface and style move synchronously at the other end of the telegraph line, the surface there being coated with paper, so prepared that its colour changes when the current passes. Or, for secret messages, the action of the current may be invisible but able to be made visible by development or by a secret ink process, &c. This large reproduction is reduced photographically, a surface of chromated gelatine is printed through the reduced negative, and from the print, by means of a plaster cast, stereotype plates are produced as usual.

Sensitized plates.—For receiving secret telegraphic messages by the use of a reflecting galvanometer, miniature plates of talc carrying a sensitized surface, are employed, which are transmitted to a distance to be developed.

1371. Lefèvre, H. April 5.



Cameras.—Relates to magic-lantern apparatus which, when closed, may be used as "dark chambers suitable for photographic purposes." The apparatus comprises an elongated box A, of cardboard, metal, &c., which may be of the shape shown

in section or of elliptical form. The box is supported on the globe holders of two lamps L, and reflectors and lenses are provided by which images of opaque or transparent objects may be produced.

2039. Wayte, C., and Herzog, C. May 22.

Photo-mechanical printing.—A thin black or non-actinic film, or a layer of coloured paper or other suitable material, such as gelatine, is produced or placed on glass, prepared paper, or other transparent material by photography, painting, pasting, or otherwise. The design, print, or figure is drawn, printed, photographed, or otherwise produced on an enlarged scale upon the film or layer, and is worked out of the film or layer by any known means so as to produce a positive or negative, as the case may be, from which a copy of any required size may be produced by photography, and then transferred to stone, metal, or other surface for printing purposes.

2095. Ritchie, J. H. May 26.

Sensitized plates.—Gelatino-bromide of silver for photographic plates is formed in a mucilage of gum, arabin formed by treating a solution of gum arabic with excess of alcohol being preferably employed. This is dried and dissolved in water, and a bromide salt and nitrate of silver are added alternately. The mixture is then dialysed until the free salts have been eliminated, and alcohol is added. When required for use, the gelatine is added and dissolved by warmth, and the plates are coated. If a larger quantity of arabin is employed the intermediate dialysing may be dispensed with. The salts may be added in varying quantities in order to render the first deposit of bromide of silver coarser and the last deposit finer. The bromide salt may be added to the gum arabic in a dry state, water being added to the gum during the process. The Provisional Specification states that a current of electricity may be passed through the sensitizing solution or mixture.

2187. Anderson, F. [Firmen-Didot, A., and Balencie, A.]. June 3. [Provisional protection only.]

Printing; enamels.—Relates to a process of printing on glass or vitreous surfaces. The surface is first made non-transparent or nearly so by any known process, as by the use of hydro-fluoric acid, sand, or iron oxide, or by enamelling with mucilaginous materials. It is next warmed and coated with an aqueous solution of grape sugar (or similar substance) containing ammonium bichromate, and is exposed under a transparent positive, "after which vitrifiable oxide is brought on prepared surface and caused to run over the same with the least possible friction until the friction has been developed to the required intensity. Finally, the surface is vitrified in a temperature of about 700°."

2271. Brewer, E. G., [Janard, J. B., and Guillot, L.]. June 9. [Provisional protection only.]

Printing; ornamenting by photography.—Relates to apparatus for printing designs photographically on continuous textile and other materials. The material having been sensitized and rolled on a cylinder is enclosed in a wood case to protect it from the light, and the case is fitted to the end of a table provided with grooves in which are fixed frames for receiving the negatives. The material issuing by a slot in the case is extended under the negatives by the action of a roller placed in a movable closed case at the opposite side of the table. After a suitable exposure a curtain moved by suitable means covers the negatives. The printed material is then rolled up on a cylinder protected from the light and provided with a counter for indicating when a proper length has been taken up. The operation is then repeated. The fabrics may be placed in the cases in folds instead of in rolls. The table may be polyhedral in form and mounted on a shaft, each face carrying a negative.

2563. Haddan, H. J., [Carrvalho, D. N., and Marx, E.]. June 26.

Sensitized films; studios.—The time of exposure for producing a photographic image is reduced by colouring the interior of the studio with a mixture of Prussian blue and deep chrome to effect an "orange-pea-green" tint which reflects rays of least actinic power, and by making the sensitive film of collodion or other substratum which is coloured violet, this being the complementary colour of the "orange-pea-green" surroundings. The silver bath employed is also coloured violet, and the negative is developed as usual and retains its violet colour, thus decreasing the time required for printing on silver paper.

2611. Borland, A. June 28. [Provisional protection only.]

Photo-mechanical printing.—A smooth-surfaced paper is coated with a solution of starch, coated again with a mixture of starch, gum tragacanth, and glycerine, dried, sensitized by an alkaline chromate, dried, printed under a negative as usual, washed, and dried on a flat board. Thus there is obtained a surface with a "tooth," on which the artist draws in lithographic chalk, using the picture as a basis. The drawing is transferred to stone for printing from as usual.

2724. Sachs, J. J. July 4.

Photo-mechanical printing.—Relates to the preparation of printing-surfaces from textile fabrics for printing on fabrics or other surfaces, being a modification of the process described in Specification No. 1193, A.D. 1879, [Abridgment Class

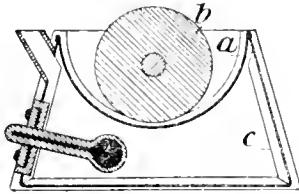
Printing other than letterpress &c.]. The fabric or material is coated with chrome gelatine, albumen, asphalt, or other substance which is sensitive to light. The fabric is then exposed under the required pattern; the protected parts remain soluble and are dissolved away leaving the pattern in relief. The surface is then coated by electrolysis, or used without further preparation.

2967. Lake, W. R., [*Eastman, G.*]. July 22.

Sensitized plates; photo-mechanical printing.—Relates to apparatus for coating surfaces of glass or other material with gelatine, or other substance, especially intended for photographic dry plates, or gelatine plates,

used in collotype printing. A trough *a*, Fig. 3, made of silver or other metal silver-plated, contains the gelatinous or other mixture, and is heated by a hot-water jacket *c*. A roller *b* of india-rubber, glass, or hard wood is supported in the trough so that its lower third is immersed in the mixture. The plate to be coated is drawn across the roller, an even coating of the emulsion being left upon the plate. The plate is then turned over and dried on a level surface.

FIG. 3.



2968. Swan, J. W. July 22.

Printing-paper; sensitized plates and films; developing.—For photographic printing, paper, or white plates of glass, porcelain, or enamelled metal coated with bromide of silver are employed. Either a gelatine or an albumen coating may be employed, the gelatine being rendered insoluble by means of chrome alum, or sulphate of alumina and ammonia, or common alum, while an albumen coating is rendered insoluble by the action of steam. Printing-paper may be employed in a long band which is moved forwards step by step as each print is made. In making a gelatine emulsion a solution of nitrate of silver is gradually added to a warm aqueous solution of gelatine and bromide of potassium. The mixture is kept warm for several hours and is afterwards allowed to solidify, and is then washed with water. To a solution of the emulsion, alum and carbolic acid are added, and the compound is then filtered out, and employed in coating paper &c. In forming the albumino-bromide compound, combined gelatine and bromide of silver are precipitated from a solution by adding methylated spirits. After washing, the compound is warmed and mixed with white of eggs. The printing-papers &c. are developed by means of a mixed solution of ferrous and potassium oxalates.

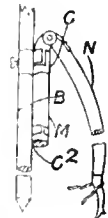
2969. Swan, J. W. July 22.

Photo-mechanical printing; sensitized plates; negatives for photo-mechanical printing, producing.—In order to produce photographic images in relief from which printing blocks and plates may be prepared, sensitive plates coated with a mixture of silver bromide and gelatine, and, if desired, chrome alum, are used. The plate is exposed in a camera or behind a negative or positive transparency, and then developed preferably by means of a mixture of pyrogalllic acid and ammonium bromide or ammonia. The plate is then placed in a hot-water bath or is hoisted while moist, to cause the parts not acted upon by the light, or only slightly so, to swell; or the plate may be dried and the parts acted on by the light dissolved out by acetic acid. An electrotype may be taken from the image, or an electrotype or a cast in type metal may be taken from a cast of the image in plaster of Paris, wax, &c, or, when the image is produced by the acetic acid process, a counterpart impression may be obtained by pressing lead or other soft metal into close contact with the image. To obtain stipple and line effects for pictures possessing half tones, pellicular screens or gratings are used, these screens having a number of fine transparent lines on an opaque ground. Such a screen may be placed in front of the sensitive plate in the camera while the negative is being taken, or in contact with the transparency being copied, or, when printing by superposition, between the transparency and the sensitive surface. The screen is moved periodically so that a stronger impression of the lines and a greater number of crossings are obtained in the shaded portion, or *vice versa* if a positive transparency is used. Different screens may be used for the same picture. Such photographs may be used for producing reliefs by the process described above or by the chromated gelatine method, either as negatives with transmitted light or as positives with reflected light, or they may be used for photo-etching purposes.

3471. Holmes, J. G. H., [*Holmes, A. L. E. II.*]. Aug. 28.

Tripod stands.—In stands for range-finders, the vertical central upright *B* in connection with a plumb line &c., has three legs *N* with parts *M* hinged to them. To remove the stand from position, each leg is pulled out of the ground in succession and disengaged at *C*, and the part *M* is pulled up until it is stopped by the round-cornered catch *C'*. The legs are then folded in and strapped to the upright.

FIG. 7.



3760. Woodbury, W. B. Sept. 19.

Photo-mechanical printing.—For producing designs in relief on thin sheets of tinfoil, soft

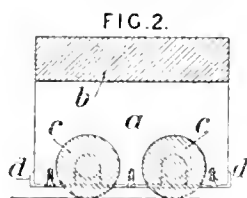
brass, lead or like metal, gelatine relief surfaces are prepared preferably as described in Specification No. 2912, A.D. 1878, but instead of simply compressing a material such as paper, a thin sheet of the metal is supported on a yielding material, such as blotting paper, india-rubber, &c., so that by pressure with the gelatine relief a metal relief is obtained. A brilliant or a matt surface to the metal may be obtained by using respectively a gelatine or a paper support in preparing the gelatine relief, and these may be combined in the same design.

3816. Scott, F., and Collins, J. S. Sept. 22.
[Provisional protection only.]

Photo-mechanical printing.—The invention relates chiefly to the production of a gelatinous surface for use instead of stones in lithography. One of the ways for using such surfaces is thus described:—"We take inks having photographic properties, which can be printed from a negative or positive, thereby producing designs or writing by the ordinary action of light, from which duplicate copies can be produced. Or we take such photographic or other inks and produce photographically or by hand, drawing, writing, or other mechanical means, designs, drawings, writings, or photographs of natural objects, which have been produced on the surface mentioned above, and having given to them suitable conducting surfaces, take electrotypes from the same." Or the said surfaces may be treated with water to obtain reliefs from which moulds can be obtained "to be used as ordinary printing blocks or cylinders." The gelatinous sheets may be superimposed to form a rigid block.

3818. Jones, R. A. Sept. 23.

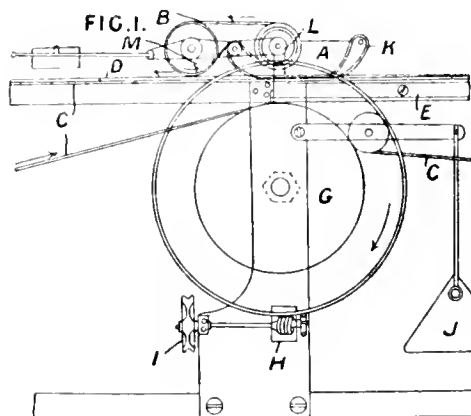
Mounting prints.—A roller apparatus for applying pressure in mounting photographic prints consists of rollers *c* mounted in a frame *a*. The frame consists of ends *a* connected by a cross-piece *b* which may be in one with the ends. The journals of the rollers *c* are received by bearings in the end pieces *a*. The bearings may be simply notches, the journals being retained by plates *d*. The frame may be provided with a handle.



4607. Swan, J. W. Nov. 12.

Sensitized plates.—In an apparatus for coating photographic plates, the emulsion is delivered on to the plate *D* from a porcelain or silver &c. trough *A*, which has a hot-water jacket *K*, by an endless india rubber band *B*, which passes over a roller *L*

in the trough and another roller *M* under which the plate passes. The band can be lifted from contact with the plate by means of a system of levers *E*. The plate *D* is fed forwards by an endless carrying-band *C* which passes over a pulley *G* driven by a



worm *H* on a spindle carrying a belt pulley *I*. The tension of the band *C* is maintained by a weight *J*. The Provisional Specification states also that the trough is supplied with emulsion from a reservoir which can be raised and lowered by a screw in order to maintain the level of the emulsion.

4733. Petit, C. G. Nov. 21.

Photo-mechanical printing.—For producing typographic lined plates from half-tone negatives, a layer of chromated gelatine is exposed beneath the negative or positive, and from this print a relief is obtained by the action of water; either cold water which swells or warm water which dissolves the gelatine, according to the amount of light which it has received. A mould of this is taken in a white substance, such as wax, and is blackened superficially with blacklead. By means of a V-shaped tool worked mechanically, parallel grooves are cut over the whole surface of the mould. The depth of cut of the tool is arranged so that the highest reliefs have the whole of the blacklead removed from them, while the lowest depressions are untouched and so retain the whole of the blacklead that is upon them. This mould is then photographed and yields the picture in pure white and black. Or the wax surface may be grooved before moulding it, the gelatine plate superficially blacked, and the two pressed together.

4784. Blamires, J. H. Nov. 24. [Provisional protection only.]

Cameras; lens fittings.—As a substitute for a focussing-cloth a dark chamber is placed or fixed in front of the ground glass. The lens is attached

to a plate capable of sliding up and down in front of the dark chamber.

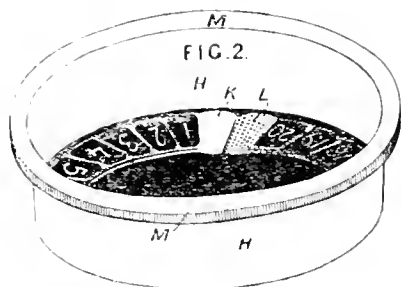
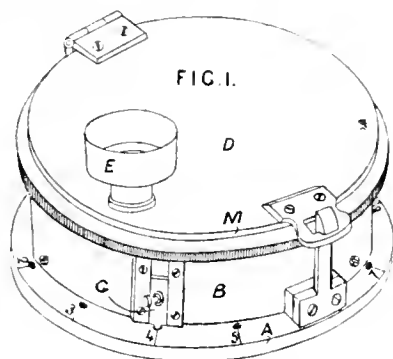
5223. Clark, A. M., [*Lémary, J. E. P.*]. Dec. 20.

Printing; sensitized films; colouring; ornamenting by photography.—Relates to the production of photographic transfers for ornamenting porcelain and earthenware and for making grisailles and cameos. A clean glass plate is coated with a sensitized composition made by mixing a solution of "manna" and dextrin, with a concentrated solution of bichromate of potash, and is dried,

exposed under a positive, and developed with oxides of cobalt and iron "without fluxes." A grey colouring is added when the photograph is for earthenware, and a little yellow for porcelain. The plate is then coated with collodion, with which may be mixed a "flux" ground with glycerine. The plate is immersed in water, then in a solution of carbonate of soda, and lastly in water to separate the film from the glass. The film, collodion side uppermost, is transferred to a sheet of paper coated with wax, spermaceti, stearin, or the like, and is pressed between blotting-paper, coated with turpentine, and dried thus forming a transfer.

A.D. 1880.

185. Warnerke, L. Jan. 15.



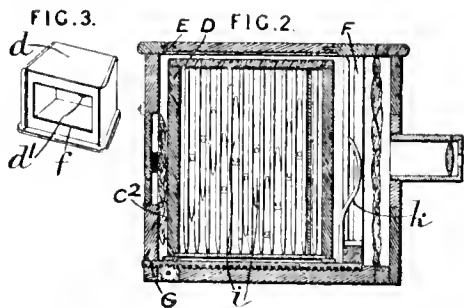
Photometers and actinometers.—The light is allowed to fall on a phosphorescent substance such as sulphide of calcium, barium, strontium, or zinc. A screen of varying opacity is then rotated over the substance until the light due to phosphorescence is completely cut off. The phosphorescent

material is contained between two glasses in a disc A; over this is a revolving box B with a hinged top D and a circular hole in the bottom opposite the telescope E. A small portion of the phosphorescent material can then be exposed to the light on opening the lid D, an indicator G on the disc A showing which portion has been exposed. After exposure, a tube H with a projecting rim M is placed in the box. This tube has a double glass bottom, and between the glasses is placed a series of semi-transparent discs of increasing opacity, 1, 2, 3, &c.; K is a clear space and a green glass for destroying the phosphorescence. The tube H is turned round in the box until the light cannot be distinguished on looking through the telescope. The intensity of the light is shown by a calculating arrangement of moving discs on the back of the instrument. For the next observation a new surface of the phosphorescent material is used by turning round the box B. If all the material still retains some luminosity this can be cut out by the green glass L.

232. Bell, G. C. Jan. 19.

Sensitized plates; photo-mechanical printing.—For producing photo-relief engravings, a surface of hard paper or other suitable material which has raised points, dots, or projections, is sensitized, care being taken that the sensitizing-material does not reach the depressed parts. This may be done by rubbing the surface with crystals of nitrate of silver. The subject is photographed on such a surface, and a positive is obtained from which a negative is produced ready for use in the ordinary process of photo-relief engraving, or for photo-lithography, &c.

498. Blair, T. H. Feb. 4.

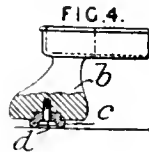


Cameras; change-boxes; plate boxes.—A camera is constructed so that a magazine or carrier containing a number of plates may be placed on the top of the camera when in use, or inside the camera when not in use. Means are also provided for finding the view without opening the camera. The front C, Fig. 2, is detachable; it is supported by swinging brackets and is connected to the body by means of a bellows or curtain, so that it may be moved forwards from the body in order to extend the camera. The view-finder consists of a hood d, Fig. 3, which has a peep-hole d' and a sliding frame f which is varied according to the size of plate used. The finder is arranged so that its view corresponds with that of the camera. It is carried separately from the camera and the observer looks through it in order to determine the position in which the camera is to be placed. Afterwards it can be placed on the top of the camera and used for final adjustment. The plates are contained in a box D which enters an opening E in the body of the camera. Grooves are formed in the interior of the box, and at the bottom of each groove is a spring i which may be forced against the corresponding plate by means of a numbered screw operated externally. The plates fall, when released, into a slide F which may be adjusted, by means of a rack and pinion, instead of moving the lens for focussing. One or more springs k press each plate into the correct position. A thin bar or plate extends from the bottom of the carrier through an opening at the back of the camera, and is graduated so that the carrier may be brought under any desired groove in the box D. The bar may be marked, when the focus has once been obtained, so that the plate may be readily moved into the proper focus after the carrier has received a fresh plate. The plate box is provided with a sliding bottom. An exposed plate is returned to its groove by inverting the entire apparatus, a felt, rubber, or other lining being provided in the top of the box D to break the fall of the plates. Instead of inverting the camera, a glove c' may be fitted to receive the hand of the operator and so permit an exposed plate to be raised without admitting light.

755. Vernon, J. Feb. 20.

Tripod stands.—To prevent the bases of valuable metallic articles from being bruised, the articles are

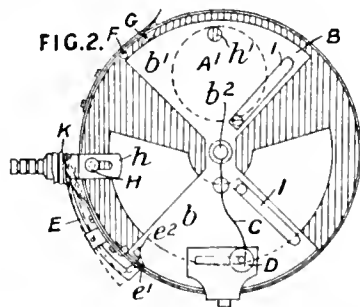
mounted on tripod stands. Elastic cushions c, similar to those described in Specification No. 2320, A.D. 1876, [Abridgment Class Furniture &c.], and No. 3602, A.D. 1876, [Abridgment Class Stopping &c.], are held in sockets in the feet by screws d, the heads of which fit in recesses in the cushions.



847. Wolfram, J. H. G. Feb. 26.

Sensitized plates.—Collodio-bromide of silver emulsion is prepared by forming silver bromide in the presence of liquid ammonia. Silver nitrate, or other soluble silver salt, is dissolved in ammonia to which some absolute alcohol has been added. More alcohol is added, then the collodion, and lastly a solution in ammonia of potassium, sodium, or ammonium bromide. The pyroxylin contained in the collodion and the silver bromide are precipitated by the addition of water, freed from ammonia and salt by decantation, dried, and dissolved in "ether alcohol" to which glycerine and a preservative may be added. Dry plates are prepared by pouring the solution of collodio-bromide of silver on to the glass plates, which may be coated previously with a weak solution of croutchouc. The excess of silver solution may be drained off or the plates may be placed horizontally and dried. The plates may be coated with a preservative.

1054. Chadwick, J., and Chadwick, W. I. March 11.



Shutters.—The shutter for an instantaneous camera consists of a plate B, made in the form of two sectors of a circle and mounted on a centre b' so that the sectors b, b' alternately obscure the lens aperture A'. A catch e' at the end of a spring lever E engages a projection e' on the shutter and holds it in the "set" position against the force of a spring C bent or compressed against an adjustable stop D. The lever E is released, to effect an exposure, by the diaphragm K at the end of a flexible tube terminating at the opposite end in an india-rubber ball filled with water. A stop F arrests the motion of the sector b when it comes opposite the aperture A', and a spring catch G prevents any rebound; the sector b' passes

clear of the stop. By adjusting the position of the stop D the exposure may be lengthened or shortened. Another stop H, sliding in a fixed slotted plate *h*, engages a grooved stud *h'* on the shutter and holds the latter open while focussing. Spring clips I are fitted on the shutter to hold a paper or other mask, cut to a suitable form, when it is desired to give one part of the plate less exposure than the other. The arrangement may be applied to cameras with a double lens, such as those used in obtaining stereoscopic photographs.

1095. Morgan, T., [Morici, A.]. March 13.
Drawings to Specification.

Tripod and like stands.—Relates to stands for telescopes, telemeters, &c. The head of the instrument is provided with hinged plugs which fit into the muzzles of three rifles forming the legs of the stand.

1112. Reynolds, J. E. March 15.

Sensitized plates and films.—Relates to a process for coating photographic films or collodion on glass or paper with protective layers of galena. Metallic lead, or a lead salt, oxide, or hydrate is dissolved alone or with other metals or metallic salts &c. in an alkaline solution to which is added

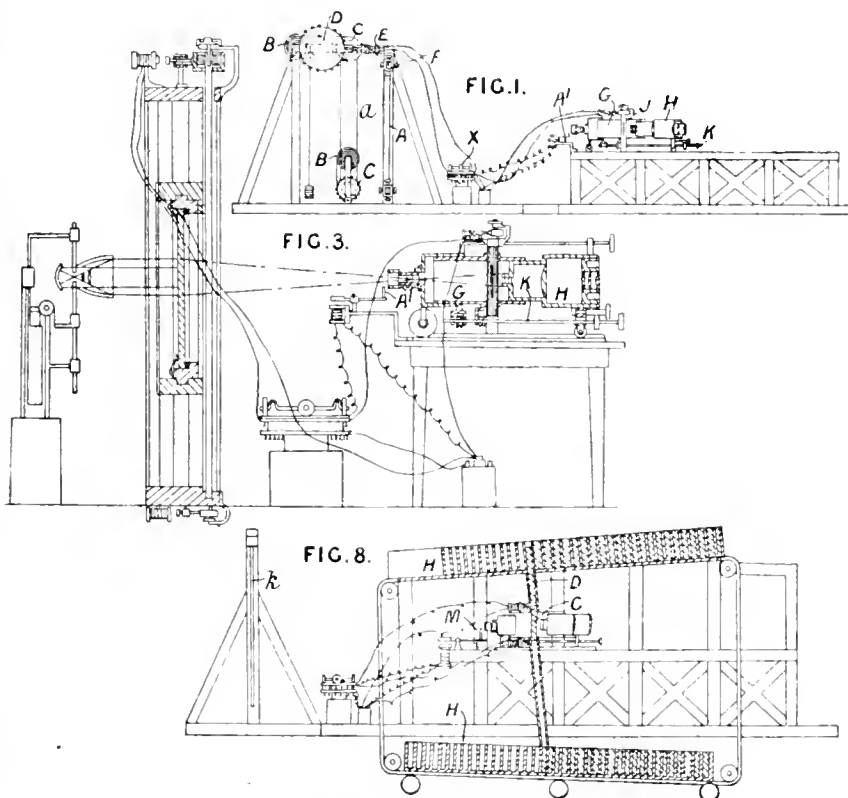
thio-carbamide or sulpho-urea or other body capable of affording sulphur by gradual decomposition in the liquid. The article to be coated is then immersed in the solution, and the coating polished if desired.

1117. Willis, W. March 15.

Printing-paper; developing.—In sensitizing-paper, as described in Specification No. 2011, A.D. 1873, by coating it with salts of platinum, iridium, or gold and ferric oxalate or tartrate, the use of a lead or silver salt in addition can be dispensed with, and better results obtained, by the use of a larger quantity of platinous salt. "Potassic-chloro-platinite" and ferric oxalate are preferably employed, and may be applied to the paper in a mixed solution or separately. The print may be developed by the use of potassium oxalate. It is then washed in a weak acid solution, preferably citric acid, and then in water. A developer for these and other like papers may also consist of tartrate, citrate, or acetate of sodium potassium or ammonium, or of monammonic, diammonic or disodic orthophosphate, or a mixture of any of these alone or mixed with salts of platinum or iridium as described in Specification No. 2800, A.D. 1878. Sodium citrate is preferably employed.

1216. Lake, W. R., [Molera, E. J., and Cebrian, J. C.].
March 20.

Copying documents &c.; cameras; lighting-arrangements; shutters; reducing; printing.—Relates to a method of producing microscopic photographs of documents, records, pictures, statuary, natural objects &c., for the purpose of preserving copies in small bulk, and to means for producing prints of the same. The documents &c. to be copied are mounted in one or more columns on a band A, Fig. 1, which is wound from one roll B to the other, and is kept flat on a frame facing the camera G by bars F. The



focussing is effected by a coarse adjustment rod and a fine adjustment screw K, with the aid of a microscope H. The band A is advanced by an automatically rotating shaft D gearing with the upper feed-roller C which is connected to the lower feed-roller C by the belt *a*. A sliding stop controlled by an electromagnet E engages with "one or more cams" on the shaft D. Each time that the magnet withdraws the stop, the band is fed forwards to present a fresh field to the camera. At the same time the plate-holder J is moved to bring a fresh portion of the sensitive plate opposite the lens. The plate-holder slides horizontally in a frame which slides vertically in a second frame. The horizontal movement is effected by a rack and pinion, and the vertical movement by a screw. The spindle of the pinion and the screw are acted upon by coiled springs which are controlled by electromagnets. During the time that the band A and the plate-holder are moving, a screen A' is brought in front of the lens. The various magnets are controlled by a switchboard X, in which a number of contact pins are covered by rollers kept in movement by clockwork. After a first reduction has been made, a second or further reduction may be made by a similar camera, but the band A is replaced by a plate-holder similar to that described above, the plate being illuminated by a strong lamp and reflector as shown in Fig. 3. For printing, the negative is held in a frame *k*, Fig. 8. The plate-holder C communicates above and below with a shoot D, down which the plates, held in carriers H, pass into the holder, from which they are discharged at recognized intervals. The plate-holder is fitted with stops, which, together with the movements of the screen M and of the plate carrier, are controlled by electromagnets.

1294. Bailey, J. W. March 30. [*Provisional protection only*]

Enamels; ornamenting by photography.—Relates to a method of obtaining transfers from photographs on enamels and the like. A glass plate coated with a mixture of bichromate of potash, borax, honey, sugar, and gum is exposed under a transparency, obtained by any ordinary photographic method. The colour is then worked into it, and it is fixed with hyposulphite of soda. The film is then removed from the glass, coated with collodion and ether, and applied to the enamel or other surface to be ornamented. The colours are fixed by burning, or by a coating of gum or varnish.

1305. Lake, W. R., [*Winter & Co., W. M. L.*]. March 30.

Finishing; varnishing; toning.—A woven fabric is coated with wax or other fatty substance upon the side upon which a photographic picture is produced by any method, such as that described in Specification No. 1264, A.D. 1877, and, when the wax has hardened is coated on the back with varnish. The wax which has penetrated the fabric

combines with the varnish and protects the fabric from damp, air, and other atmospheric influences, and increases the clearness and depth of the tone. The fabric may be painted with oil colours and varnished.

1419. Sachs, J. J. April 7.

Photo-mechanical printing.—A relief is obtained, as by exposing a chromated gelatine surface and washing with warm water or soaking in cold, one giving the design and the other the ground in relief, and a cast is taken in Spence's metal or a similar substance. This cast may be printed from direct or may furnish electrotypes. The original surface may be brought into greater relief after treatment with water by "passing over it whilst "in the plastic state any powder or fibrous "material."

1543. Edwards, B. J. April 15.

Plate boxes.—A box for containing photographic plates is made of cardboard or other suitable material, and is provided at opposite sides with vertical grooves to receive the edges of the plates. The grooves are made by attaching pieces of folded or corrugated paper or other material. A sliding or hinged lid may be employed.

1569. Mewburn, J. C., [*Favre, L.*]. April 16. [*Provisional protection only.*]

Colouring; chromo-gelatine processes.—After transferring a positive carbon picture to a glass or crystal plate, the back of the bichromatized sheet is coloured at certain parts, and is then coated with gelatine, collodion, or varnish. The body colours are then applied, the lighter shades of colour being applied before the darker shades. The colours are preferably made with "essence of "spirit" so as to dry more quickly.

1570. Fischer, W. H. April 16.

Photo-mechanical printing.—A "mill" or die for impressing calico-printing rollers is obtained by depositing metal electrically on the bare parts of the surface of a roller, on the surface of which a photograph in relief of the object has been taken. The sensitive coating preferably consists of Syrian asphalt dissolved in benzol to which has been added oil of lavender. The design may be drawn on transfer paper and transferred to the roller and the roller then exposed. The pattern is developed by means of turpentine mixed with petroleum. The bare parts of the roller are washed with weak sulphuric acid and then the roller is immersed in a strong solution of sulphates of iron and ammonia, the anode being a large plate of iron to which is attached a plate of copper. Or, a cast may be taken of the gelatine relief, and from the cast, a galvanotype in steel, from which the "mill" is

produced by stamping or rolling. Flat dies produced by electrodeposition may be used as binders' engraved tools, and the "mills" for embossing or impressing books &c.

1637. Bell, G. C. April 21. [*Provisional protection only.*]

Photo-mechanical printing; printing.—Dotted or lined photographs are obtained by placing a metal screen of wire gauze &c. preferably in front of the negative during the printing process. Ordinary photographs may be thus treated, or photographs on sensitized wood, metal or stone surfaces for engraving purposes, or on sensitized gelatine surfaces for the photo-relief or photo-lithographic processes of printing.

1647. Martyn, A. April 21. [*Provisional protection only.*]

Ornamenting by photography.—A glass surface to be ornamented is covered with gelatine sensitized with the chromates of potash or ammonia, or other substances rendered insoluble by the action of light. A negative or cliché is placed over the film and the plate is exposed. The parts of the film unacted upon are washed away and the remaining portion is coloured and then varnished. The design may be backed up with paper, gilt, silver, &c. The glass may be gilded or silvered before the application of the gelatine, the parts exposed by the washing being afterwards dissolved away. Metal surfaces to be ornamented are varnished or painted before the gelatine is applied.

1856. Baum, F. May 6. [*Provisional protection only.*]

Photo-mechanical printing.—In a photographic method of preparing etched copper plates suitable for use in printing in colour on paper, wool, cotton, or any woven or knitted fabric, a film of bichromated gelatine is exposed to light under a positive or negative of the design &c. The film is then brought into contact in cold water with a material known as "flexible support," which supports the film while being developed in hot water and afterwards when placed against the copper surface. When the film and support are dried, the support comes away from the film, which is then hardened with a solution of alum, tannin, &c. A bath of acids &c. is finally employed to eat away the exposed portions of the copper behind the gelatine film. Any perforated or semi-opaque substance such as lace, muslin, skeleton leaves or plants, or printed paper may be used instead of a negative or positive.

1909. Sachs, J. J. May 10.

Photo-mechanical printing.—In one method of preparing a printing, stamping, and embossing roller,

the roller is covered with chrome-gelatine, and is exposed under a translucent pattern or design to an electric or other light, the roller being rotated so as to expose every part of its surface successively. The soluble parts of the chrome gelatine not acted upon by the light are then washed away, and the exposed metallic surface is etched by a solution of iron perchloride or similar reagent. The chrome-gelatine surface may be treated directly with the iron perchloride solution without previously washing away the soluble portion. In a second method, a photograph or chrome-gelatine paper is transferred to the roller by pressure or otherwise, and the paper is removed leaving the gelatine film on the roller. The soluble parts of the film are then removed by washing or otherwise, and the entire surface is covered with a solution of bitumen, asphalt, or similar material in benzene, or turpentine, or their equivalent, after which the roller is placed in a metallic or etching solution; the roller is preferably rotated and is connected with a voltaic circuit. The chrome-gelatine portions adherent to the roller are loosened in order to permit the action of the etching-liquid by first immersing the roller in a solution containing hydrochloric or other free acid, or by adding an acid to the etching-solution.

2068. Warlich, F. H. May 21. [*Provisional protection only.*]

Enlarging.—An electric lamp or other source of light is placed in a compartment having enlarging cameras on one or more sides. The condensers in the sides of the compartment may be of solid glass, or they may be hollow to contain water. They are cooled by currents of cold air supplied through pipes. The positives or negatives to be enlarged are placed near the condensers, and the lenses and sensitive surfaces are placed at suitable distances from them. For accurate focussing, the puts are mounted on tables with racks and pinions. Vignetting is effected by screens between the lenses and the sensitive surfaces. The enlargements are made on "carbon tissue."

2162. Brydges, E. A., [*Vogel, H. W.*]. May 27.

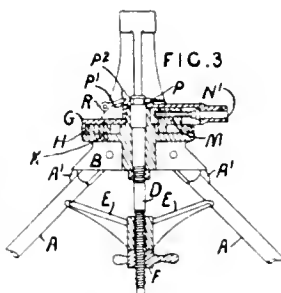
Sensitized plates and films.—Gelatine emulsions containing bromide, iodide, or chloride of silver and pyroxylin are prepared by using as solvents the lower members of the series of fatty acids, such as acetic, formic, propionic acid, their derivatives, or mixtures of them, alone or with alcohol. Such solvents take up both gelatine and pyroxylin, and do not photographically injure the silver compounds. Three ways of preparing the emulsions are described. (1) A gelatine emulsion is prepared as usual, and dried, then dissolved as above. This solution alone may be used, or pyroxylin dissolved as above may be added to it. (2) A collodion emulsion may be prepared as usual, washed and dried and dissolved in the acidulous solvent and the gelatine alone or dissolved

added to it. (3) The gelatine or pyroxylin may be dissolved, and the emulsion produced in the mixed solution.

2172. Lake, H. H., [*Parkhurst, E. G.*].
May 27.

Tripod stands.—

In a portable tripod support for a machine gun, the legs A, Fig. 3, are held in their extended positions by means of the clamp E and nut F, the upper parts of the legs being provided with V-shaped projections A' which are pressed into corresponding recesses in the fixed head B. The rotating head G is secured in position by means of the fork P which takes into a groove in the spindle D. When the lever R, which is attached to the fork P, is pressed downwards, the projection P' takes into a notch in the head G, and when the lever is raised the projection P' bears against the spindle D and acts as a fulcrum during the withdrawal of the fork P. The head G may be fixed by means of a friction clamp H which is attached to the head G and is tightened by means of a clamp-screw. The horse-shoe spring K is fixed to the head B and has ends which are inclined outwards in such a manner that as the pin M is moved towards the centre by means of the handle N', the head G may be rotated more and more relatively to the head B, and when the pin M is at its innermost position, the head G may be completely rotated. The spring K takes any shock when the head G is moved from side to side. The movement of the ends of the spring is limited by stops. When the stand is folded up, the clamp E is slightly rotated so that its arms pass between the legs A.



copying plans, drawings, documents, and other pictures composed of black and white, upon paper, textile fabrics, earthenware, porcelain, &c. The drawing to be copied is laid upon paper sensitized with a solution containing gum or gelatine, sodium chloride, iron perchloride, "sulphate of peroxide of iron," and tartaric acid. The tartaric acid may be replaced by acetic acid, and the sodium chloride may be omitted. After exposure to light, the print obtained is developed in a bath consisting of an acid or alkaline solution of red or yellow potassium ferrocyanide. The print is finally washed, immersed in an acid bath, and again washed and dried. Salts of silver, or zinc, or other metallic solutions may be used in the developing-bath, to produce a dark or blue black lined or marked positive direct from an original or marked negative.

2533. Knott, R. June 22. [*Provisional protection only.*]

Sensitized plates and films.—Two bottles connected together by means of a perforated stopper are employed for preparing emulsions for use in photography. The perforation may be reduced by the introduction of a silver wire. The mixing is effected by shaking, and is made more certain by making one side of the stopper convex.

2782. Lake, W. R., [*Flagler, H. K.*].
July 7.

Photo-mechanical printing.—Relates to a process for reproducing figures or designs upon metal, stone, glass, or other like surfaces for use in plate printing &c., to a process for transferring figures &c. to curved surfaces such as the rolls used in calico printing, and to a process for transferring figures &c. to a metal plate or to paper for use in the pantograph engraving process. In the first process, a photograph on paper of the design is transferred to the metal &c. surface by any photo-mechanical process, or is reproduced upon it by means of suitable transferink. An etching-ground consisting of shellac dissolved in alcohol is distributed over the design on the metal surface, and adheres only to the exposed metal &c., leaving the design exposed. Turpentine or benzene is then used to wash off the exposed ink of the design, and the etching-acid being then applied, an intaglio reproduction of the design is obtained on the metal. The metal plate is finally washed and dried. Copper cylinders may be engraved in the above manner, and the process may also be applied to stone or glass surfaces. In the second process, an outline tracing of the design is shadowed upon sensitized paper by means of a camera, and is then transferred to the curved surface, which for this purpose is covered with a thin coat of varnish. A special sensitizing-composition is used upon the paper in order that the dampening necessary when applying the paper to the curved surface may not damage the design. The design is then engraved on the curved surface. In the third process, the metal plate or paper is covered with a thin coating

2249. Dutkiewicz, B. de, and Decoufé,
A. E. June 2.

Mounting prints; varnishing; colouring.—Relates to a process of mounting on cloth, photographs, engravings, prints, &c. A piece of fine cloth is pressed or rolled, the photograph &c. is mounted upon it, and it is then stretched on a frame and varnished with a mixture of copal varnish and turpentine, to impart transparency and solidity. After drying, the cloth side is coloured in oils, and the picture is subsequently mounted on another thickness of cloth by means of copal varnish and heavy pressure. The picture is finally touched up.

2304. Thompson, W. P., [*Joltrain, A.*].
June 8.

Copying documents, drawings, and the like.—Relates to a process of, and a composition for,

of the sensitizing-composition, and an enlarged photograph of the design is then produced upon it directly by means of a camera. The metal plate used is then engraved by hand, or, if paper is employed, it is then used upon the pantograph table without further preparation for the production of the design on the required surface.

Sensitized films.—The sensitizing-composition used in the second and third of the above processes consists of 96 ounces of water, 13 ounces of ammonium bichromate, 3 ounces of alcohol, 2 grains of silver nitrate, and $1\frac{1}{4}$ pounds of gelatine. The proportions of these materials may be varied.

2966. Sachs, J. J. July 19.

Printing; producing wearing diagrams &c.; copying drawings and the like.—Paper or the like is covered with chrome gelatine, chrome gum, chrome saccharine, or equivalent materials, or with asphalt mixed, if desired, with resin or the like, and facsimiles of openwork materials or fabrics, or of photographs or designs are produced upon the paper by the action of light.

3036. Lake, W. R., [Eastman, G.]. July 21.
[Provisional protection only.]

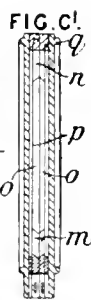
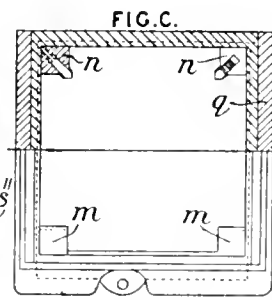
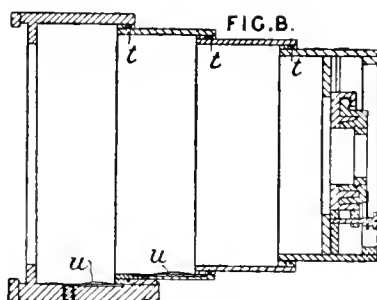
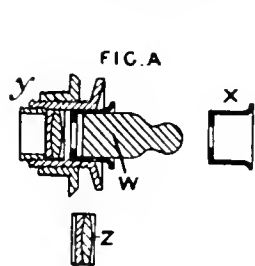
Sensitized plates; varnishing.—Relates to apparatus for applying an even layer of gelatine, albumen, varnish, &c. to surfaces of glass, metal, wood, papier mâché, &c. specially applicable for the production of photographic gelatine plates. The coating-material is contained in a reservoir

which communicates with a valve chamber. Both the reservoir and valve chamber are fitted with a hot-water jacket. The gelatine &c. is led to a horizontal tube which is slotted at the upper part, the length of the slot being varied by means of a wedge. The valve is held closed by a spring, and is opened by pressing a stud on the valve-stem which extends through the end of the tube. The plate to be coated is drawn across the slot as the gelatine &c. escapes, the drip being caught in a trough. A linen filtering-bag for the reservoir and levelling-screws are also provided.

3130. Clark, A. M., [Scotellari, D.]. July 29.
[Provisional protection only.]

Ornamenting by photography; enamels; transparencies; sensitized plates.—For producing designs in glass, porcelain, &c., applicable for use as "artistic stained glass," the surface is coated with a solution of honey, glucos, and gelatine, to which is added potassium or ammonium bichromate, and a print taken either by direct contact or in a camera. The image is "developed" by enamel or glass powder brushed on, and fixed by firing. In the case of large plates, the plate on which the image has been produced is made to form one side of a glass box containing enamel powder. "When sufficiently charged, the adhesive deposit is allowed to remain at least three days and is then immersed for twelve hours in a bath of plain water." A solution of borax in spirit and turpentine is then applied, and the plate is coloured by metallic salts, enamels, &c. applied by means of spirit or gum and the plate is then fired.

3353. Stanley, W. F. Aug. 18.



Cameras; dark slides; lenses and lens fittings.—The parts of the camera are made telescopic, the front draw being the smallest. Each sliding part is secured by a spring *u* at its lower part, and is made dust tight by a cord *t* laid in a groove round the join. The dark slide *q* has several separate "inner adapters" each of which fits in the dark slide and carries two plates. Each "adapter" consists of a central diaphragm *p* fixed between two wooden trays grooved to receive iron plate slides *o*, which are drawn out from the underside by means

of knobs. The "adapter" has four corner pieces *n*, *m* to enable it to carry oblong plates; the angle-pieces *m* are undercut and acted on by spring latches. The dark slide is fixed to the camera by sliding it in a groove, or preferably by pressing it on to a projecting tongue. The lenses are in metal cells, as shown at *z* so that more than one may be used to vary the focus, and the diaphragms or stops *X* have exterior turned out rims, and are pushed in from the front; the ordinary cap is replaced by a plug *W*, and the fine adjustment is

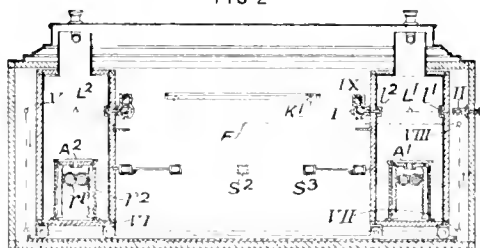
obtained by screwing the lens tube y into or out of a collar fixed to the camera front. The camera front is mounted so that it can be drawn out of the vertical position by a screw S^1 to get the effect of a swing back.

3355. Hallett, F. H. Aug. 18. [*Letters Patent void for want of Final Specification.*]

Printing; colouring.—Relates to a process for obtaining coloured photographic prints, and consists in colouring a weak print and afterwards albumenizing and completing the printing. The paper is salted, sensitized, and exposed under the negative till the outlines are visible. After fixing and washing, it is immersed in alcohol, dried, rolled, and coloured lightly and flatly with vegetable colours mixed with a vehicle composed of distilled water, albumen of egg, glycerine, sal-ammoniac and liquid ammonia. It is then rolled, immersed in alcohol, and albumenized by floating on a bath consisting of white of egg, sal-ammoniac, distilled water, and acetic acid. After drying, it is sensitized and again printed to bring out the details &c., being finally toned, fixed, and enamelled if required, in the usual way.

3464. Coglievina, D. Aug. 26.

FIG 2



Photometers.—In a box A^1 is a source of light L^1 , which sends rays through the lens l^1 , and is reflected by right-angled prisms II to $VIII$, of which III and IV are at the back of the case, to a ball F placed in front of a mirror S^2 so that it can be seen from outside the photometer box. The source of light is turned down until the beam is just strong enough to show up the ball F ; this strength of light is adopted as a unit. This standard flame is then placed opposite a lens l^2 , and by reflection from the prisms I and IX , the light falls on a ball placed at K^1 , which is seen by means of a mirror S^3 . A second source of light L^2 is placed in the box A^2 , which is moved to the right until the ball F is equidistant from the two boxes. If now the ball F is equally illuminated on both sides, this second light will have an illuminating power of one degree. If it be greater than one degree, the box A^2 is moved to the left until the ball is equally illuminated when the degree of illumination will be indicated on a scale outside the photometer case. To avoid having a very long case, the box A^2 is moved until it indicates ten

degrees, and then the light in it turned down until the ball is equally illuminated. This second light is then used as a unit, and the first light turned up and adjusted until it indicates 100° . By proceeding in this way the intensity of the light can be determined. The boxes A^1 , A^2 are on rollers and are moved by a rack and pinion &c., the height of the light being adjusted by racks and pinions r^1 , r^2 . The ball F is of phosphorus, quinine solution, fluor spar, &c., to make the light visible. When used for measuring the intensity of sunlight for photographers' use, the light is admitted at an adjustable slit.

3511. Andreoli, E., [*Germeuil-Bonnaud, J. B.*] Aug. 30.

Ornamenting by photography; printing; colouring.—Relates to a process for applying coloured photographs to pottery, glass, and metal surfaces. A glass plate is cleaned with potassium iodide and is coated with a solution of syrup of fœcula, gum arabic, and bichromate of potash in distilled water, containing, if necessary, a few drops of glycerine, and is dried. The film is printed under a photograph rendered transparent by vaseline or the like, and suitable colours, having pigments of metallic oxides, are dusted upon the film, which is then coated with collodion, containing a little glycerine if necessary, to protect the colours. After drying the collodion for a moment, the plate is immersed in water to disengage the film, and is then placed, with the film on it, in a bath of caustic potash to dissolve the organic matter and the bichromate, and is washed. The edges of the film are cut, and the plate is turned over in a regenerating-bath in which the porcelain &c. article is placed. The film floats in the bath, and the picture is brought into register with an outline picture which has been drawn upon the porcelain &c. By drawing off the liquid, the film descends into place upon the article, and is held there by the pressure of the atmosphere. The regenerating-bath consists of a solution of borate of sodium to which gelatine and ammonia are added, and is intended to restore to their original condition the fluxes which were contained in the colours applied to the sensitized film and were destroyed by the caustic potash.

Re-touching; intensifying.—A photograph may be re-touched or defined more strongly in parts, by making a photographic film as described above and placing it in register upon the part which requires to be brought out.

3650. Sachs, J. J. Sept. 8.

Photo-mechanical printing.—A fusible substance, which may be used for taking casts of chromo-gelatine photographs or any writing, painting, or drawing produced by photography &c., is made by melting sulphur with some other substance or substances, other than metals or metallic sulphides, such as coal, silicates, metallic salts, emery, asbestos, ultramarine, powdered minerals, wood, fibrous materials, &c. The cast may be allowed to cool in a vacuum.

3702. Morgan-Brown, W., [*Pixis, T.*].
Sept. 11.

Colouring; mounting prints.—In a method of colouring photographic prints and transferring them to cloth, wood, leather, tissue, &c., the surface of the material is suitably coloured and the photograph transferred upon it. Or, before colouring, a thin photo-print may be produced on the material to give the outlines and thus facilitate colouring. Or the print may be transferred to transfer paper, and then, after being coloured, transferred to the surface as required. Or tracing-paper or linen, or a thin sheet, of gelatine, glass, or other suitable material may be employed, and afterwards painted from behind. Or the colours may be applied directly to the print so that no colour will be on the front side, some Japan gold size being added to the printing-ink to cause the print to dry quickly.

3753. Clark, A. M., [*Scotellari, D.*].
Sept. 15. [*Provisional protection only.*]

Chromo-gelatine processes; transparencies; ornamenting by photography; sensitized plates &c.; enamels; colouring.—Relates to the production of ornamental and other designs on carriage lamps, windows, and other surfaces. The surface is coated with "enamel collodion," consisting of an aqueous solution of honey, glucose, gelatine, and ammonium or potassium bichromate, and is then exposed under a positive or in a camera. The image is then developed by brushing on enamel or glass powder, and the plate is fired. If the plate is large, the plate is made to form one side of a transparent box in which the powder is placed. When sufficiently charged with the powder, the adhesive deposit is allowed to remain three days and is then soaked in water to remove the yellowish coating coloured by the bichromate; a part of the flux being removed, it is replaced "by a solution of borax at 10 per cent., by applying with a badger hair brush over the whole surface a coat of a solution of four parts of spirit of turpentine, and one part of fat spirit." The front is then coloured by means of metallic oxides and salts, silicates, and enamels, applied with spirit; or, preferably, the colours are applied with gum, on the back. The plate is then fired.

4087. Wharton, A. L. Oct. 8. [*Provisional protection only.*]

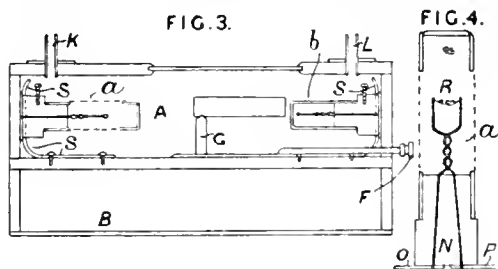
Stands.—Relates to holders for the stems of broken wine glasses, applicable also for holding other articles ending in a stem. A vertical tube attached to a base-plate carries at the top a pair of jaws lined with india-rubber which are hinged at their lower ends to a plate so that they open when raised by a pusher to which the plate is connected. A spiral spring acting on the pusher draws them into the tube and clips the stem of the vessel or article.

4360. Schnorrenberg, N., [*Grüne, W.*].
Oct. 26. [*Provisional protection only.*]

Mounting prints; colouring; finishing.—In a process for mounting and colouring photographs on glass to produce coloured pictures in imitation of oil or water colour paintings, a print from a photographic negative on pigment paper is transferred directly, in cold water, on to a glass plate. After an interval of about five minutes, the picture is developed in hot water, and is then dried and coated with varnish. Powdered pigments of any colour or bronze powder or the like are applied to the varnish coating to produce the desired effect, and, after drying, a protective coating of glycerine. When this coating has dried, the picture is partially or completely covered with a black or other paint or varnish, and is then finished.

4408. Nawrocki, G. W. von, [*Limbeck, W. S.*]. Oct. 28. [*Provisional protection only.*]

Photometers.—This invention depends upon the principle that the electric conductivity of selenium increases in proportion to the light cast upon it. The apparatus used to measure the amount of light consists of a selenium plate included in an electric circuit, in which is a current from a constant source of electricity and a galvanometer.

4833. Liveing, E. H. T. Nov. 22.

Photometers.—Relates to an apparatus for detecting and measuring inflammable gases in coal mines, ships' holds, furnace flues, &c., which depends on the increased brilliancy of electrically-heated platinum wires due to the gases referred to. The apparatus comprises a flat box B, Fig. 3, containing the armature and magnets of a magnetoelectric machine, a box or chamber A containing the platinum-wire devices &c., and a part containing the driving-wheels of the machine, operated by a handle. The box A is provided with a close-fitting lid in which are tubes K, L, and by these or by opening the lid the air to be tested is admitted. Two platinum spirals are employed which have been rendered sensitive by heating them to redness in an atmosphere containing an inflammable gas of low igniting point, or by raising them to a white heat in a rich mixture of marsh gas and air. The working spiral R, Fig. 4, is placed in a glass-ended wire-gauze tube a, Figs. 3 and 4, for the air to pass

it, and the other spiral is in an airtight glass tube *b*, these spirals being connected with metal plates *O*, *P* attached to insulated plugs *N*. They are arranged in front of pairs of stout plates *s*, one of each of these forming the terminals of the magneto machine while the others are in metallic contact with each other. A graduated scale is observed through a glass window in the lid of the box, and when equal illuminations are obtained on each side of a sliding angular screen *G*, moved between the spirals by a slide-rod *F*, the result may be read off the scale. The scale is viewed by the light of the wires, and it may be adjusted by a thumbscrew. For preventing sparks from the break of the magneto machine, the armature and one end of the coil are brought in metallic contact, thus forming the bearing as one pole. The other end of the coil terminates in an insulated wire which passes through a perforation in the armature axle, and is held there by a spring for making the other pole.

4922. Edwards, E., [*Tilbet, M.*]. Nov. 26.

Copying drawings and the like.—Sensitized paper for copying drawings, engravings, and other designs is prepared by passing paper through a bath containing white soap, alum, Flanders glue, white of eggs or albumen, glacial acetic acid, alcohol, and water, and then through a bath containing burnt umber ground in alcohol, black pigment, glue, and bichromate of potash. Paper so prepared is exposed in a printing-frame under the drawing &c., and is washed, when the design comes out white. From this negative, positives are obtained by exposing under it paper which has been sensitized in a bath similar to the second described above, but with black or other pigments instead of burnt umber. The prints are developed and fixed by soaking in water.

4949. Dredge, J. Nov. 27.

Photo-mechanical printing.—Producing lined, dotted, or granulated printing-surfaces from photo-relief or intaglio plates. The relief plates may be produced by the usual processes, and are then coated with paraffin, the surface of which is preferably made flat, so that the highest part of the relief plate is level with the top of the film. A V-shaped cutting tool is then passed over the plate in parallel lines, taking care that it exactly follows the surface of the relief plate and therefore cuts grooves which are deeper and wider as the hollows of the plate are deeper. Such a surface,

when reproduced, may be used for printing from in an ordinary press. Or a rigid relief plate or its counterpart may be inked by an elastic surface provided with raised lines, dots, &c., and impressions may be taken in a press; or an impression may be obtained on transfer paper for litho-printing; or an impression may be transferred to a metal plate to be treated by the "Gillotype process" to produce a printing block. Or the relief plate, for use as above, may be of elastic substance as well as the inking-surface; or it may be made on a film of paraffin or such substance suitably supported. This last form of relief plate may have lines, dots, &c., produced upon it by pressure against a suitably-prepared plate or roller, and the surface may then be reproduced by electrotype. When the relief is produced on an elastic foundation, the grain &c. may be produced by interposing a piece of such material as silk between the mould and the substance with which the relief surface is produced. Or instead of using lines, dots, &c., pictures may be produced by printing successively with a series of relief plates, all produced from the same mould, but each having its surface removed to a different extent, so that on the first, only the deepest depressions remain, while the last has its surface untouched. Thus the ink accumulates where required by the successive printings.

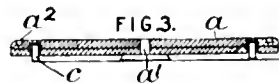
5013. Wild, A. J. T. Dec. 2.

Copying drawings and the like; printing; developing; fixing.—Paper is sponged or otherwise treated with an aqueous solution of chromate of potash and sulphuric acid, and dried. After printing by exposure under the tracing or drawing to be copied it is placed in a vaporizing-box, containing aniline oil, alone or mixed with ammonia, and is then washed and dried. It is finally sponged with an alkaline fixing-solution. Paper prepared as above may be applied to other photographic purposes.

5176. Clarke, J. P. Dec. 10.

Studio accessories.

—A circular turntable *a*, Fig. 3, for use in posing a sitter works on a central pivot *a'* and is supported



on rollers *c*. The table is turned by a long hooked rod, held by the operator, which is engaged in holes *a^2*, or staples or projections provided on the table.

A.D. 1881.

10. **Clark, A. M.,** [*Corbassière, (dit Christian), L., and Liebert, A.*]. Jan. 1.

Sensitized plates and films; positives, producing directly; printing; developing; toning.—Relates to a method of rapid printing from negatives, and producing pictures in the camera without negatives. The paper is prepared by mixing a suitable insoluble silver compound with the paper pulp, or by applying to the surface of the finished paper a bromide of silver gelatine emulsion. The emulsion is prepared by adding albumen, which has fermented in water, and potassium antimoniate and silver nitrate to one half of a solution of gelatine, and a solution of ammonium bromide to the other half, and then mixing the two solutions. Such paper is exposed under the negative to a feeble light, and developed preferably with ferrous oxalate, though ammonia alone will develop the image. To produce the ordinary photographic tints, the picture is next dipped in a bath containing bichloride of mercury, bichloride of tin, and sulphuric acid, and then placed in a bath consisting of an aqueous solution of soda-lime, with a little ammonia, borax, gold or platinum chloride, or other salt, according to the colour required. A picture so produced will give other prints without the action of light, by pressing upon it a sheet of paper or fabric moistened with nitric acid, then other sheets impregnated with protochloride of tin or other substance producing the same result, and lastly immersing these sheets together in a bath containing a base according to the colour required. The process may be applied to wood, cloth, silk, or other fibrous fabrics, and also to metal "inferior to silver," to marble and such surfaces, by first coating the material with a varnish not acted upon by acids. To obtain white prints on a coloured substance, barium sulphate or other inert matter may be added to the sensitive material. White prints on a black or coloured ground may be produced in the camera without a negative, by using paper coated with the emulsion above described and coloured if desired. Such paper is exposed, developed, and fixed as usual, washed, and immersed in an acidulated solution of corrosive sublimate to whiten the image. Such a picture is reversed; to set it right the mode of double transfer may be adopted. The picture is sized with paste slightly acidulated with hydrochloric acid, and is then varnished or enamelled. According to the Provisional Specification, the developed picture is dipped in a bath containing tin protochloride, potassium sulphocyanide, fermented albumen, and sulphuric acid.

142. **Stanford, E. C. C.** Jan. 12.

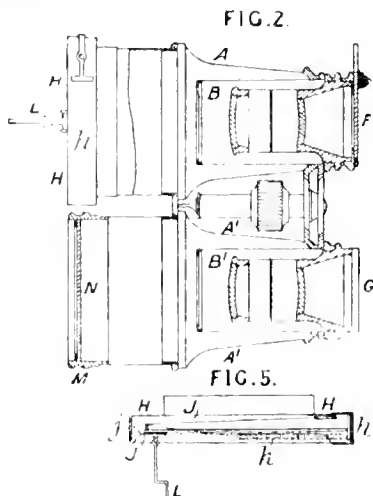
Sensitized films.—"Algic acid" and "algin" are employed for photographic films and for other purposes. The algin, which may be regarded as alginate of soda &c., is obtained by boiling the residue resulting from the lixiviation of comminuted seaweed with an alkali or with borax. The glutinous solution formed may be filtered, strained, concentrated, bleached &c., for sale; or the residue may be dried and ground up with the alkali &c. and packed for sale, the mixture being boiled with water for use. The algin thus produced may be treated with an acid or salt, to precipitate algic acid.

266. **Sachs, J. J.** Jan. 21. *Disclaimer.*

Photo-mechanical printing.—Relates to the formation of intaglio or relief printing-surfaces on rollers, lithographic stones, and other bodies. Paper or other suitable flexible material is coated first with a sensitive mixture of gelatine, gum, &c. and potassium or ammonium chromate &c. and then with a transparent resist of asphaltum with wax &c. A facsimile of any open pattern, design, &c. or a transparency is obtained on the sensitive coating by exposing it to light under the pattern &c., or by throwing an image of a positive or negative of the pattern upon it by means of any suitable apparatus. A coating of wax and asphaltum or any substance which will adhere to metal and will resist the etching liquid to be employed is applied to the sensitive coating, and the whole is then placed in a bath of water preferably containing a little alkali until the parts untouched by the light swell up above the other parts. The resist covering these swollen parts is sponged off, and the paper is applied to the printing-roller &c. with the resist downwards. The resist may be applied to the sensitive coating before or after exposure or washing. The roller is finally etched in a suitable bath containing preferably perchloride of iron, the paper being removed or not as desired. A continuous or alternating electric current may be applied to the roller while in the etching bath. In another method, a facsimile of a dotted surface is first produced on the sensitive surface before the facsimile of the design is produced upon it, the subsequent treatment of the paper and sensitive surface being as before. According to the Provisional Specification, asphaltum, either alone or with transparent materials, may be used as the sensitive coating, but in this case benzine or turpentine must be used to

wash off the material not affected by light, and a cement or tartaric acid, caustic soda, &c. must be used to attach it to the surface to be etched; this surface may otherwise be warmed to cause the asphaltum to adhere. For producing a "pin-engraving" of half-shade subjects, the developed sensitive surface with the resist is perforated all over, when placed on a flat surface, with an instrument provided with a number of tapered pins. The size of the holes produced varies with the thickness of the sensitive material. The material is then attached to the surface to be etched, the subsequent treatment being as already described. A species of mezzotint is obtained if the chrome-gelatine sensitive material is mixed with powdered resin or other resist. In the preparation of printing-surfaces for colour-printing, a plate of chrome-gelatine &c. is prepared for each colour, and is then painted over with a resist on the part not wanted for the corresponding colour before attachment to the surface to be etched; these parts may otherwise be blocked out in the transparency employed in the first operations, or the surface may be formed with a raised etching of the whole subject and then further etched after the part corresponding to the colour to be etched has been blocked out with a resist. The processes described may be applied to the pantograph etching-processes. A design may also be drawn by hand or printed on paper or on a gelatine &c. plate by means of a resist, this paper &c. being then applied to the surface to be etched with the resist downwards; the etching is then performed as before.

775. **Abel, C. D.**, [*Loiseau, A., and Germeuil-Bonnaud, J. B.*]. Feb. 23.



Cameras; dark slides; shutters; tripod and like stands.—Opera and field glasses are arranged so that they may also be used as cameras. Fig. 2 shows a plan of a marine glass having the end caps attached by bayonet-joints so that they can be readily removed and replaced. One tube B is provided with a cover plate F kept closed by a spring when it is released, and the other tube B'

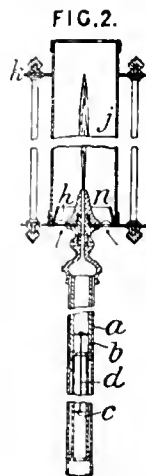
has a screw-cap G which is removed at the time of operating. The photographic appliances are fitted at the front of the glasses; one case A has a frame H to hold the sensitized plate, and the other case A' has a frame M carrying a ground glass N which serves for focussing. The sensitized plate is introduced through a slit in the upper part of the frame H; and the slit is covered by a hinged cap h, Fig. 5, held by a snap spring. The plate is covered by a black screen J wound on a small roller j; when the screen is withdrawn a hook L carried by the screen is hooked over the cap h, and on unhooking it a spring k acting on the roller drags the screen in front of the plate. For instantaneous work, a drop shutter sliding in guides is released by blowing a vane which turns a spindle and so removes a catch which supports the shutter. Stereoscopic views are obtained by replacing each eye-piece by a photographic objective and each object glass by a focussing screen or sensitive plate holder. Or a small bellows arrangement fitted like an ordinary camera may be attached to the barrel of the glass, and the ordinary objective of the glass may be used in photographing. The photographic objective may be fixed in the eye-piece of the opera glass, and a cap carrying a double concave lens may be slipped over it when it is required for use as an opera or field glass. For instantaneous views the instrument may be held in the hand, or a light portable tripod stand, the upper end of which carries a double claw hinged to a stem on a universal joint and having a screw thread on which is a screwed cap projecting over the lower ends of the claws, may be used; one barrel of the glass is introduced between the claws and the cap screwed up, so as to move the claws towards each other.

814. **Bonneville, J. M. A. L.** Feb. 25.
[*Provisional protection only.*]

Sensitized films.—Nitro-saccharose and the nitrous products of sugar obtained by treating sugar with nitric acid or with a mixture of nitric and sulphuric acids, may replace collodion and gelatine in photography. The nitro derivative is insoluble in water, but soluble in hot acetic acid or methylated spirit.

821. **Thorp, T., and Tasker, R.** Feb. 26.

Photometers.—Relates to that class in which a flame is maintained at a given height, and the amount of gas being consumed affords a measure of its illuminating power. The gas passes up a slightly conical tube b and raises a disc on the upper end of a rod d, at the lower end of which is a small perforated disc moving in a glass tube opposite a slot in the case a, against a scale indicating candle power. The burner used is either a jet, as in Fig. 2, or an argand burner. The air supply h is



annular and fitted with a conical deflector *n*. A mark on the chimney *j* or a plate *k* serves as a gauge for the height of the flame. If an argand burner is used, the gas passes through wool &c. placed at the bottom of the burner.

979. McIlvenna, F. March 8. *Drawings to Specification.*

Tripod and like stands.—In telescopic stands, instead of a set-screw fastening, a lever, preferably of hard wood, is inclined upwards at an angle of about 70° to the inner rod, so that when the latter is pressed down the lever is wedged against it.

1096. Coghlan, J. H. March 14. [*Provisional protection only.*]

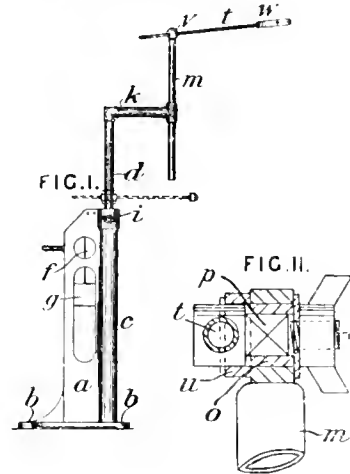
Photo-mechanical printing.—Casts are made in Spence's metal from intaglio or engraved surfaces photographically or otherwise produced, and are used to print from. The Spence's metal is toughened by melting it and adding to it marine glue or other such substance. The cast is printed from by the ordinary process of mechanical printing, the ink being preferably similar to that used in the Woodbury process, but with less grease.

1436. Warnerke, L. April 1.

Producing photographs of special character; transparencies; enamels; sensitized plates and films; developing; colouring; enlarging; photo mechanical printing.—Relates to the production of negatives and transparencies &c. where the parts unacted on by light and development are dissolved away. For producing the sensitized film, a colloidal substance, such as gelatine or dextrin is used, supported on paper or other suitable material, the film being produced by emulsion or by the bath process. For preparing a suitable gelatino-bromide emulsion, for example, a solution of gelatine, ammonium bromide, and water are mixed and boiled with a solution of silver nitrate and water, more gelatine being added, after cooling, to form a stiff jelly, which is then washed in cold water. The paper, first coated with gelatine, is then coated once or twice with the emulsion, in one of various ways. Exposure may be in the camera or otherwise, and for developing, a solution may be employed consisting of pyrogallol, ammonium bromide, and ammonia, with citric acid, water, glycerine, and alcohol. The image may be fixed or not. Care is taken in the whole treatment to avoid the use of substances, such as alum, that would produce general insolubility of the film. When dry, the picture is placed in contact with glass, paper, or any suitable surface and plunged into warm water. The picture adheres to the surface, and that part of the film which does not hold any part of the image is dissolved away. The image is reversed, but this may be remedied by using

transfer paper, or by similar methods. Enlargements &c. may be produced on paper, canvas, &c., and insoluble pigments may be added to the emulsion, if desired. For relief clichés, to be used in preparing printing surfaces, the sensitive film must be sufficiently thick. A grain may be produced by adding an inert powder to the emulsion. For ceramic photographs, vitrifiable colour is added to the emulsion. For the phototype or collotype process, the image produced as described on glass is thickly covered with plain gelatine; when dry and peeled off, the surface that was next to the glass may be treated as usual in the phototype process, and made to give the impression in printers' ink. For obtaining transparencies in colour for magic lanterns &c., the image developed on plain glass is treated with colouring-media direct or by double decomposition.

1517. Edwards, E. April 7.



Head-rests.—In a head-rest in which the parts do not descend by their own weight when loosened for adjustment, a vertical tube *d*, Fig. 1, fits freely in a hollow vertical column *c*. The column is carried by a hollow frame *a* which is supported by three or more feet *b*. The interior of the column communicates with the interior of the frame by a vertical slot. A flexible cord, wire, or chain *f* is attached by a hook to the bottom of the tube *d*, the cord passing over pulleys at the top of the frame and being attached to a balance weight *g* inside the frame. Three studs pass through the upper part of the column, a thumb-screw *i* serving to press the tube against the studs and so secure it. At the upper end of the tube a transverse tube *k* is fixed; or the tube may be arranged to swivel round the vertical tube. The transverse tube carries an adjustable vertical tube *m*. A balance weight may be fitted, to work inside the tube *d*. At the top of the vertical tube *m*, a rod *t*, to which is secured a head-rest *w*, is carried by a bolt *p*, Fig. 11. Part of the shank of the bolt is made square to fit into a square hole in a

bush *o*. The bush fits fairly tightly into an eye *v* at the end of the tube *m*, the eye being split, so that the bush does not turn easily. When the thumb *s* is tightened up, the rod *t* is pulled against a washer *u* and held securely. Instead of the bush, the bolt may fit fairly tightly into the split eye. Two screws may also be employed, one for fixing the bar longitudinally and the other for setting it at the required angle. Or a taper pin may be screwed in between the bar and the washer *u*. A body rest may also be fixed to the vertical tube *d*, Fig. 1. Instead of having a hollow frame for the balance weight, the latter may work inside the column *c*, the vertical tube passing through a hole in the weight; or an annular balance weight may surround the column. The tubes may be filled with non-conductors of sound.

1538. Haddan, H. J., [*Hutinet, J. J. D., and Lamy, P. E.*] April 8.

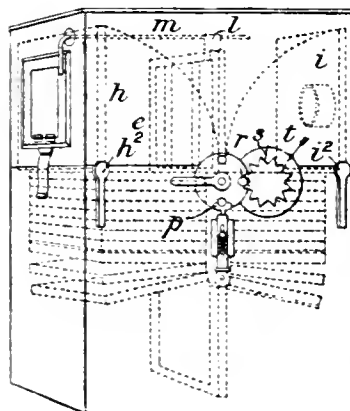
Printing-paper.—Photographic paper is coated with a gelatino-bromide emulsion and also with another substance to give brilliancy to the print. The paper may be first coated with gelatine or other gummy or albuminous substance containing a white colouring-matter, such as barium sulphate, or wax, soap, or white gum lac solution, and is then dried, calendered, and polished before being coated with the gelatino-bromide emulsion. In some cases, a solution of resin or a resinous substance or collodion may be applied to the paper as the preliminary coating. In one modification, the emulsion is applied first, and then the paper is coated with a white resin or gum lac solution either by passing the paper through a basin or by means of rollers. In a second modification, a solution of the resinous substance is added to the emulsion so that only one coat is necessary, or this coat may receive another of the resinous substance alone. In a third modification, an emulsion of gelatine mixed with silver bromide or other silver salts is first applied to the paper, which is afterwards coated with a gelatinous, gummy, or albuminous solution containing alum or other suitable salts for rendering the coating insoluble after it is hardened and dried. Glycerine or sugar is added to the ingredients used for preparing the paper in order to prevent the paper from becoming brittle.

1559. Pumphrey, A. April 9.

Sensitized plates and films.—Relates to photographic films which may be stripped from the glass before or after exposure. A glass plate or a similar surface is coated with plain collodion, and a narrow strip of the margin of the layer is removed. When making a wet plate, a solution of gelatine, either with or without a little chrome alum or other substance for preventing the swelling of the gelatine, is poured over the film, and, when dry, the compound film is coated with gelatine or collodion emulsion or iodized or bromized collodion as in the usual wet-plate

method. When the negative is finished, the film is cut round and stripped from the glass. When making a dry plate, the surface is coated with collodion and with gelatine as previously

FIG. 3.



described, and the gelatine emulsion is then applied, or the gelatine emulsion is applied directly on the collodion film. These dry films may be stripped from the glass before exposure or before development, in which case they are mounted, by means of a solution of india-rubber in mineral naphtha, on paper, which supports them during development and fixing.

Drying.—After the picture is completed, the films are removed and are stretched during drying, preferably by pinning the films to a board, a row of pins soldered to a metal strip being used for each edge of the film.

Cameras; roller slides.—A camera, which is especially of use in exposing the films described above, consists of a rectangular box, the upper portion of which is used as a camera proper, the remainder containing the films and the apparatus for manipulating them. Each film is held by a frame *f* fixed by one of its edges to an endless band, which passes over two rollers so that, as the rollers are turned, each film is brought successively into the vertical position behind the lens, the frame carrying the exposed film being secured in the vertical position by means of a stop *l* on a rod *m*. A spring stop *p* engaging with pins *r* on a disc on the axis of the upper roller determines the correct position of the lower edge of the frame during the exposure of its film. The pins *r* engage with the teeth of a wheel *s*, the teeth being numbered so that the number of the tooth towards which a fixed pointer *t* points denotes a film being exposed. One of the frames carries a ground glass for focussing, and screens *h*, *i*, capable of being raised or lowered by handles *h²*, *i²* into the vertical or horizontal positions, are employed for screening off parts of the box while focussing, moving the film frames, &c.

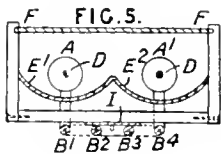
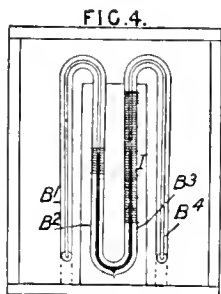
1602. Steinheil, H. A. April 12. *Drawings to Specification.*

Lenses.—Relates to the construction of portrait and view lenses so as to obviate the falling off of definition towards the edges of the picture. Each of the lenses consists of two combinations, the front having a shorter focal length than the complete lens and the back combination a long negative focal length. The chromatic and spherical aberrations of the two combinations are of opposite sense, so that the two combinations correct each other. In a view lens, the lenses of each combination are cemented together, and the combinations are placed quite close to each other. The front combination has a positive focal length, and consists of a convex flint-glass lens and a concave crown-glass lens, while the back combination has a negative focal length and consists of a concave flint-glass lens and convex crown-glass lens. In a portrait lens, the front combination consists of a convex crown-glass lens and a concave flint-glass lens cemented together, and has a positive focal length; the back combination, which has a less aperture and a negative focal length, consists of a separated concave flint-glass lens and a convex crown-glass lens. The distance between the two combinations is equal to one-third the aperture of the front lens.

1751. Hurter, F. April 23.

Photometers and actinometers.—The two bulbs of a differential air thermometer are made to absorb rays of different refrangibility, the difference of temperature indicated serving as a measure of the intensity of the light. To absorb different rays the bulbs are coated with coloured materials which are equal absorbers of radiant heat; or coloured strips may be placed inside the bulbs, or coloured glasses placed in front. For photographic purposes red and white colours are used, and for ordinary purposes black and white are used. The two

cylinders A, A', which act as bulbs, are connected at the bottom by the siphon capillary tube B¹, B², B³, B⁴, the limbs B², B³ of which contain coloured liquid. In the cylinders are rods, round which wool D is wrapped, in one red and in the other white. The cylinders are placed in a box lined inside and outside with polished metal, and having a glass front or a thickness of solution to absorb heat rays. The tubes are placed outside the box and are provided with a sliding scale I. In the box are placed parabolic mirrors E¹, E² to concentrate the light on the wool D. Should the



cylinders be affected differently by radiant heat alone, the glass F in front of the most sensitive is covered with varnish, or both cylinders may be surrounded by other cylinders of adjusted lengths. Instead of an air thermometer a differential thermopile may be used; or an ordinary thermometer may be placed in different parts of the spectrum.

2142. Beck, W. H., [*Piquepé, (alias Morgan), P.*]. May 17. [*Provisional protection only.*]

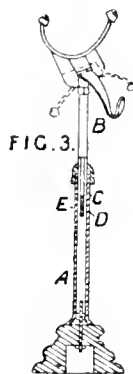
Printing.—The printing-paper is arranged on a roller at one end of the printing-frame and wound on to a second roller at the opposite end. The frame is made in the form of a box of sufficient depth to receive the rollers, and is fitted at the front and back with sliding shutters. A stretching-board, either plane or slightly convex, is placed between the rollers to keep the surface of the paper even. The separation of the prints is facilitated by a perforating-apparatus worked by hand or automatically.

2169. Chabrel, E. J. May 18. [*Provisional protection only.*]

Tripod stands.—A portable easel, or reading or music stand, has three folding legs, the joints of which are stiffened by means of a peg. The two front legs, and a short back piece, are connected at the top by a joint similar to that of a foot rule, and to the back piece the back leg is hinged, to allow of adjusting the tripod in any direction. A cross-bar, with a projecting ledge to support the canvas frame, music, or book at any desired height, is adjustably fixed to the front legs by means of straps &c. Or the front legs may be formed with series of holes, in which pegs are inserted to support the canvas &c.

2237. Thompson, W. P., [*Ligne, P. de.*]. May 23.

Stands.—Relates to stands for displaying clothing, such as hats, boots, shoes, trousers, and other articles. To adjust the height of the stand, the supporting stem B, sliding in the socket tube A, is provided with a screw C and nut at the end, and a cork or rubber washer or washers, which latter can be compressed by the screw and nut, in order to make the friction sufficient to support the stem and top in any position. A cap or packing at the end of the tube A steadies the stem B.



2381. Bonneville, H. A., [*Guillebaud, W. H.*]. May 31. [*Provisional protection only.*]

Embossing photographs.—In order to produce moulds and dies for embossing photographs in bold rounded relief, a gelatine or other mould is obtained by exposing behind a pane of ground or translucent glass to which the picture has been transferred, a sheet or layer of gelatine, which is afterwards treated with water or other liquid. The sensitized medium may be in a liquid or semi-liquid state and confined in a frame or receptacle. A plastic cast is taken from the mould, its edges are rounded off or bevelled, and from the cast an electrotype and a counterdie are made, between which the photographic print is embossed.

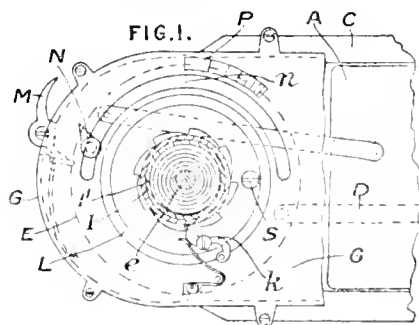
2526. Holroyde, J. B. June 10. [*Provisional protection only.*]

Sensitized films.—The sensitized film for the negative is supported on translucent paper instead of on glass.

2527. Woodbury, W. B. June 10.

Photo-mechanical printing.—To reproduce pictures obtained by photography, a gelatine printing-surface is prepared on glass by the action of light; ductile metal is then pressed into intimate contact with this surface, which is coated with a solution of india-rubber in benzene to make the metal adhere. Where half tones are to be reproduced, pictures are obtained by semi-transparent gelatinous ink applied to the printing surface, and are thence transferred to paper, a white pigment on a dark background, or a positive picture, being used to prevent reversal of the design.

2783. Sands, C. June 25.



Shutters.—The shutter, used for exposing rapid plates, and described on pages 555-6 of the *British Journal of Photography*, A.D. 1879, is fitted with means for regulating the time of the exposure and for keeping the aperture of the shutter open or closed, or for keeping the aperture open to any

required extent. The shutter, which consists of two perforated metal plates A working in a frame C, is operated by links D connecting the plates to a disc E, shown by a broken line, mounted on an axle e. A spring, which rotates the axle e, is coiled inside a box I provided with a screw cap I' having a milled head to enable the spring to be wound up. The travel of the plates A of the shutter is limited by a screw S, which connects the back and front of the casing G and passes through a semicircular slot in the disc E. The disc E is held in various positions, corresponding to different exposures as denoted by a circular scale L, by a spring pawl k, or by means other than a friction clutch. A spring detent M engages with notches in the edge of the disc E and holds the plates A so that the aperture is open or closed partly or wholly. A knob N, attached to the disc E and working in a curved slot n in the front of the casing G, carries an index which is used when the shutter is used as a diaphragm or stop. The index works over a scale P divided so as to indicate the relative areas of the aperture in different positions of the shutters.

3012. Sachs, J. J. July 8.

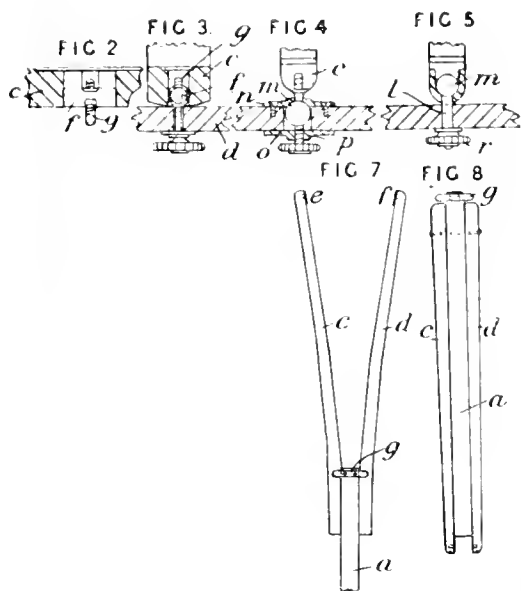
Photo-mechanical printing; ornamenting by photography.—A compound for taking a cast of a chromo-gelatine photograph consists essentially of a mixture of sulphur and slate dust, to which may be added coal dust, plumbago, emery, or other hard or silicious powder and colouring-matters. The castings are preferably cooled in a vacuum tube to get rid of air bubbles &c., and they are used for the production of copies or impressions by the electrotype or other process, or for ornamental purposes.

3014. Smith, G. July 8.

Cameras.—To facilitate focussing in a camera, the frame c, Figs. 2 and 3, carrying the focussing-plate, is rounded on its lower edge and provided with a socket to receive a cylindrical pin f through which the screw g passes. The frame is adjusted backwards or forwards about the pin f and laterally about the screw g, and is secured, when adjusted, by tightening the screw g. In a modified form, the screw is inserted in the pin f and provided with a nut below the base d. The cylindrical pin may be replaced by a ball m, Fig. 5, or a segment of a sphere, provided with a screw l and nut r, or the screw may pass through the ball and have a head below the base, or the ball m may be screwed to the frame c, Fig. 4, and placed below the plate n, being held in position by the screw p passing through the plate o.

Tripod stands.—The legs of a camera support are made in three parts, the central part a, Fig. 7, being pivoted between the parts c, d, and provided with a stop g. The part a is secured by springing open the upper ends of the parts c, d until the sockets e, f are fitted upon pins on the base. A

stand may be provided with two compound legs as described, and an ordinary sliding leg. The parts are folded together as shown in Fig. 8.



3366. Rogers, J. Aug. 3. [*Provisional protection only.*]

Automatic apparatus; roller slides; shutters.—Relates to apparatus for registering the number of passengers entering or leaving, or both, a tram-car, omnibus, or other public vehicle during a journey, also applicable for recording the arrival and departure of workmen. A sheet or band of sensitized paper is moved by clockwork behind a lens, within the field of which each passenger comes on entering or leaving, or both; a picture or mark is thus produced upon the paper which may be afterwards developed. The paper may be drawn off one bobbin and coiled on another, or it may be mounted on a revolving drum which also moves in the direction of its axis, so as to produce a spiral picture upon the paper. Or a shutter may be actuated by clockwork, or by a passenger entering the vehicle, so as to cause the exposure to be made. Glass or other surface may be used instead of paper.

3504. Methé, J. R., [*Hoesch, F. C.*]. Aug. 12.

Photo-mechanical printing; colouring; ornamenting by photography.—Relates to the production of pictures in colours, the method being also applicable for printing on glass and porcelain &c. A scale of tints is first produced on a flat surface of card or paper. For this purpose, the surface is divided in squares, and the divisions are tinted

with graduated shades of grey in an irregular manner, a photograph of the tinted surface being then taken and a heliographic or gelatine relief plate obtained from the negative. This relief plate is rolled with, say, blue ink, and an impression taken showing squares of blue of different intensities. The impression is then moved through the space of one square, and the relief plate is cleaned and used to apply an impression in, say, red. This is repeated with yellow, or other colours are used that may be considered primary. The method by which each square has been tinted is carefully noted and the whole forms a scale of combined and graduated tints. Drawings are made of the coloured object to be reproduced, and are shaded in grey only, each drawing representing in grey the varying intensity of one of the primary colours. The reproduction of intensity and tint is done by finding the required tint on the scale described above, and arranging that any particular part of the picture shall be treated exactly as the determined square of the scale was treated, so as to reproduce the tint in its proper intensity. The parts of the drawings which are not tinted with grey are painted over with white pigment. Such shaded drawings may be three only, one for each of the primary colours, but an extra one may be required for a neutral tint, and another extra one to represent local colour to heighten the effect. More than five drawings may be used. From each of these shaded drawings a relief plate is made as described above, and these relief plates are printed from, in their proper order, to produce the picture, using the colours as for making the scale. As any colour may be used, the method is applicable for producing pictures on glass, porcelain, enamel, &c. to be afterwards burnt in.

3570. Bogue, D., and Le Moussu, B. C. Aug. 17.

Photo-mechanical printing.—For preparing tinted and embossed drawing or transfer paper, the surface is coated with a composition which may be readily scraped, and is then printed with a ruled or dotted tint, and finished by pressing across this tint a relief block. The ink is pressed in where the relief block comes in contact with it. On these relief lines, points, or dots, divided tints of graduated intensity, up to perfect black, may be produced by means of a pencil, chalk, or brush. Gradation is obtained by scraping off the printed tint, leaving the lines or dots, and these also can be removed for the high lights. The drawing is then ready for the usual processes of photography, photo-lithography, or photo-typography. The relief pressure blocks may have their lines more or less conical, round, undulated, or curved in vertical cross-section, or of other suitable form. Other kinds of blocks and plates may be used, and other surfaces, as silk, parchment, &c. may be treated.

- 3628. Haddan, H. J.,** [*Lefevrier, J.*]. Aug. 20. [*Provisional protection only.*]

Cameras; dark rooms.—An outdoor camera for use with wet collodion plates is provided at the back with a compartment for developing. The plate holder is mounted in a front compartment separated from the rear compartment by a movable partition. The plate holder is pivoted horizontally at its lower edge so that it can be turned down backwards by buttons outside the camera, to immerse the plate in the necessary baths. The baths are successively introduced through the back of the camera. The operator observes the development through yellow glass panes in the top and back of the camera.

- 3657. Sachs, J. J.** Aug. 22.

Chromo-gelatine processes; copying documents &c.; photo-mechanical printing—Relates to the production of casts, copies, or impressions of patterns, devices, or designs suitable for ornamental and other purposes. A sensitive layer is prepared, as, for example, chromated gelatine, preferably supported on paper, which is varnished, preferably with asphalt dissolved in turpentine. This layer is exposed to light so as to get an image of the design upon it, either by direct superposition or by the use of a camera or lenses. The exposed sheet is soaked in water containing, say, ammonia or acetic acid to swell the unaltered chromo-gelatine, and the varnish is gently rubbed off the parts that swell up. The varnish remaining in the sunk parts protects the fine edges in the after work. A casting is taken from this surface in an easily fusible substance such as Sachs' cement, described in Specifications No. 3650, A.D. 1880, and No. 3012, A.D. 1881, or Spence's metal, the operation being preferably performed in a vacuum. Instead of swelling up the parts of the sensitive layer not acted on by light, they may be washed entirely away before casting. Impressions may be taken from the cast for electrotyping, or the cast may be electrotyped upon direct. A model of a house or other object may be produced by taking a photograph of each side and producing from each photograph a relief cast as above; by putting the casts, or electrotypes from them, together, a model in relief is obtained. For deeper relief, the chromated gelatine, or its equivalent, is cast in a thick layer direct on the photograph, design, or negative, or with only a thin film, as tracing paper, between. The outer surface of the chromated gelatine is made opaque, the exposure is given, and it is treated as described above. Designs may be drawn by hand on a film of plain gelatine or its equivalent with an ink containing a substance that will make the gelatine insoluble either with or without exposure to light; or a mixture of such substances may be used.

- 3664. Justice, P. M.,** [*Dewé, J.*]. Aug. 23. *Drawings to Specification.*

Mounting prints and the like; colouring.—The natural tints, lights, and shades of the object are obtained in a photographic picture by mounting it near coloured media and reflecting-surfaces. The picture is made translucent and is tinted on the back or front, and is then placed between two panes of glass or other transparent material. Behind the picture are placed coloured media through which the light is transmitted, and a coloured surface which reflects light upon the back of the picture. The surfaces between which the picture is mounted may be coloured to represent skies &c. The picture may be mounted on a silvered glass, metal, or other surface, so that light passes through from the front only.

- 3718. Wolff, J.** Aug. 25.

Chromo-gelatine processes; printing; producing photographs of special character.—In a method of sizing, dyeing, and printing textiles by the aid of chromated gelatine or other mixture sensitive to light, the material is impregnated with gelatine and a chromate solution, together or separately, and then exposed to light, and the soluble parts are removed by washing in water or ammonia. The chrome-gelatine may be coloured with any suitable pigment or dye, and the fabric thus simultaneously dyed and sized with the mixture. Suitable mordants may be added to the sensitive compound, to fix the colours. To produce patterns the coloured sensitive mixture is printed on, exposed to light, and washed. Or the sensitive mixture may be printed on &c. and the dye applied afterwards. Or the material may be impregnated with the coloured or plain sensitive mixture, exposed to light coming through the pattern desired, such as a transparency, and then washed, &c. Patterns in many colours, or a coloured pattern on a coloured ground, may be produced by combining these methods with ordinary methods of dyeing. For printing from a pattern or transparency, it may be fixed on the outside of a revolving transparent cylinder. The light used is within the cylinder, and the material passes round the cylinder at the same rate as the cylinder rotates. More rollers than one may be used, and the transparency may be arranged over them as an endless band. Or the cylinder carrying the transparency may be arranged behind a screen which has a slit in it to allow only a portion of the revolving surface to appear at one time; this exposed part is focussed on the material by a camera arrangement, and during exposure the material and the transparency move at the same rate.

- 3732. Clark, A. M.,** [*Michaud, A.*]. Aug. 26. [*Provisional protection only.*]

Photo mechanical printing; negatives for photo-mechanical printing, producing.—Relates to processes

for engraving by means of photography. A bi-chromated gelatine print is applied to a polished copper plate, prepared by electrolysis, or the negative itself may support the print or relief formed on its surface, and the dry print is kept in a damp place for several hours, blacklead, and applied to a molten alloy of bismuth, tin, lead, and mercury which forms, on cooling, a printing-surface in intaglio. A rectangular frame supported upon a flat plate is employed to contain the molten alloy upon the surface of which the photo-relief is applied; the frame is separable diagonally to release the intaglio produced therein. Negatives of subjects in half tint are grained, for which purpose they are coated with a thin pellicle and exposed under a glass plate coated with an adhesive material and dusted with an opaque powder. Fabrics may be employed instead of the powdered plate. A polished metal plate is coated with bitumen, exposed, and developed with spirits of turpentine, after which a brush charged with gum arabic acidulated with nitric acid is passed over its surface, which is then washed and dipped in a solution of mercurous nitrate and again washed and silvered. The exposed bitumen forming the design is removed with benzene or ether, and the plate immersed in a bath of ammonio-mercuric sulphate, the reduced mercury being removed by heat, and the plate is ready for printing from. Should the silver coating become altered during the operation, a solution of bitumen or engravers' varnish is applied, the excess being removed by means of charcoal, leaving only that remaining in the lines of the engraving; the plate is then dipped in the mercurous salt, washed, re-silvered, dried, the bitumen removed by means of benzene or ether, and the attack continued in the ammonio-mercuric bath. In place of the bitumen exposure described, designs may be produced in transfer ink and transferred to the said metal plates, which are etched as described. A polished plate, as described, may be silvered and exposed to the action of sublimated iodine. When the plate assumes a saffron yellow colour it is exposed beneath a negative, fixed in hyposulphite of soda, and coated with a solution of engravers' varnish in spirits of turpentine. The positive picture thus produced is traced with a point, which removes the varnish and the insensible layer of silver, and placed in the ammonio-mercuric bath as described, when it is ready for printing.

4320. Brookes, W. Oct. 4. [*Provisional protection only.*]

Cameras; shutters.—A portable or pocket camera is fitted with a focussing-lens of the same focal length as the main lens and in the same plane with it. The two lenses are connected so that both are simultaneously focussed, one on the sensitized plate, and the other on a plate of ground glass in the same plane as the sensitive plate. The aperture in the shutter, which is similar to the one described in Specification No. 1054, A.D. 1880, coincides with the focussing lens during the focussing-process, and when the catch retaining the disc is withdrawn by the finger, the disc is actuated

by means of a spring and the aperture passes over the main lens, thus momentarily exposing the plate, which is held in position by means of a screw clip.

Change-boxes.—A box, having grooves to receive the sensitive plates, is fitted to slide along the bottom of the camera in a rabbeted guide which may be extended in the rear of the camera and hinged so as to fold out of the way when not in use. The plates may be successively brought opposite to a slit in the camera, and may be transferred to the camera and *vice-versa* by inverting the camera.

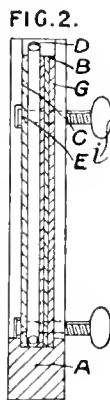
4333. Sands, C. Oct. 5. [*Provisional protection only.*]

Change-boxes; dark slides.—The openings in the change-box and the dark slide or back are covered by leather &c. strips which slide in grooves, and these covers are unlocked automatically when the dark slide is fitted on to the change-box, by a pin in each fitting into a hole in the other. The change-box has two openings, one for withdrawing and one for returning the plate. Plates may be changed either with or without their carriers, and the carriers are so constructed that one or more plates can be inserted or removed at the same time.

4394. Pass, E. de, [*Guillebaud, W. H.*]. Oct. 10.

Photo-mechanical printing; embossing photographs—Relates

to a process for obtaining by photography bas-reliefs, medals, casts, dies, and the like, in rounded relief for embossing, stamping, moulding and pressing, in particular for embossing photographs. A positive or negative is obtained on or mounted on ground glass, or upon an equivalent translucent material, to obtain diffused light upon the sensitive material. The face of the picture is then varnished. Sensitized gelatine, in the liquid or jelly form, is exposed behind the picture, either in contact with the varnished picture, or separated from it by a sheet of insoluble gelatine, collodion, mica, or glass to obtain greater diffusion. The picture, photograph, or negative B, Fig. 2, is placed in a frame A with a piece of ground glass G outside and a sheet of mica in-side in front. Packing D is interposed between these and the back plate C to form a cell or trough and the whole is clamped together by bars E and screws i; the sensitized chromo-gelatine or albumen is then placed in the cell. On exposure the gelatine solidifies in proportion to the intensity of light falling on it, so that when the liquid gelatine is afterwards poured and washed away a mould or photograph in relief is left in solid gelatine. A



plaster cast is taken from the gelatine mould, and from this a wax or other cast is taken, allowance being made in the size of the photograph or negative for the shrinkage of the wax in cooling. The wax cast is supported in a wooden skeleton frame and is then moulded or modelled by pressure from the front or back, and then backed with plaster to fix its shape permanently. The surface of this mould is covered with blacklead and subjected to electrolysis to obtain a concave metal-lined electrotype from which a matrix can be taken in any metal. The photographs, mounted or otherwise, are then pressed between the concave electrotype and the matrix and embossed.

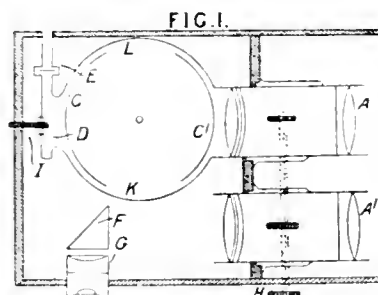
4822. Brewer, E. G., [*Boca, P.*]. Nov. 3.
[*Provisional protection only.*]

Shutters.—Relates to shutter mechanism for regulating the time of exposure when photographing. Two shutters are employed, one for uncovering and the other for closing the lens. A needle connected to escapement mechanism is moved over a graduated dial to the division denoting the time of exposure, and, by means of a ratchet, a watch spring for operating the escapement mechanism is tightened at the same time. The speed of the escapement is regulated by placing discs of various weights on the axis of the anchor escapement. The opening-shutter is held in the closed position by the projecting part of a catch which is held down by an arm; this arm stops the movement of the escapement mechanism and is placed in the upper end of a detent. When the detent is raised, the opening-shutter drops and the escapement mechanism is released. When the needle arrives at the zero position, the escapement mechanism by acting on a lever disengages an arm from under the closing-shutter and allows the closing-shutter to fall. Both shutters are moved by springs, and the opening-shutter falls on to a spring to prevent concussion. The velocity of the needle may be varied by using a different anchor escapement. If the movement of the needle is too short, the movement is doubled by means of a pin passing through the central axis and abutting on a second pin which is fixed to a disc carrying a finger-piece for acting on the lever when the needle arrives at zero. Two closing and two opening shutters may be operated by similar mechanism in the same manner.

4823. Bolas, T. Nov. 3. [*Provisional protection only.*]

Cameras; shutters; change-boxes.—A pair of twin lenses A, A' is used, both being actuated from the milled head H. Behind the lens A' is a reflecting prism F and an eye-piece G for focussing; the side of the prism next the eye-piece may be polished or ground. The lens A opens into a cylindrical chamber on the opposite side of which the sensitive plate is supported in a chamber D, being held by a screw I. Within the cylinder is a second cylinder C, C' with openings K, L in opposite sides, so that

as it revolves the lens and sensitive plate are both either exposed or covered. For instantaneous views, this cylinder is quickly turned through a half circle. The plate holder has a sliding shutter E and separate movable receptacles for other plates



are similarly constructed; when the mouth of the movable receptacle is fitted to the mouth of the receptacle D, a plate is shifted from one to the other by turning the apparatus over.

4996. Plener, J. Nov. 8. *Drawings to Specification.*

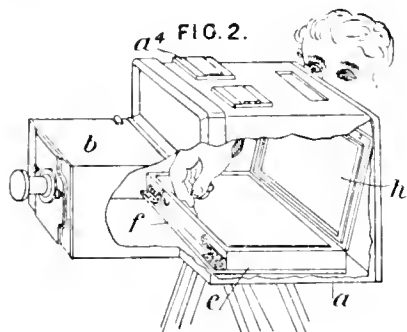
Sensitized plates and films.—In the preparation of a photographic emulsion, the melted emulsion is placed in a vessel which may be shaped like a truncated cone, and is silver plated inside. The vessel being rapidly revolved, the silver salt is deposited round the base, the gelatine is removed, and the salt mixed with warm water and again separated, the washing being repeated till complete. The silver salt is then mixed with fresh gelatine or other medium. For a collodion emulsion, the washed salt is mixed with glycerine and then with alcohol; after settling, it is washed again with alcohol, dried, and mixed with plain collodion. If the emulsion fogs, through over-boiling, the coarser particles only are first separated by a less rapid rotation. If the sensitiveness has become impaired by faulty preparation, the emulsion is treated with ammonium bromide, boiled as usual, and then washed as described above.

4967. Pumphrey, A. Nov. 12.

Dark slides; change-boxes; cameras; plate boxes.—Relates to a camera b having a rectangular box a for changing films or plates and a dark slide c for storing and exposing them. The camera fits on to the front of the box a which has a hole or sleeve on one or both sides through which a hand is introduced to change the films, and non-actinic light is admitted through glazed openings a' at the top. The focussing-screen or the dark slide forms, when in position, a division between the camera and the box a. A door at the back of the box a allows the camera to be focussed. The dark slide contains a pile of sensitive films all facing one way, and an opaque screen is placed under the film about

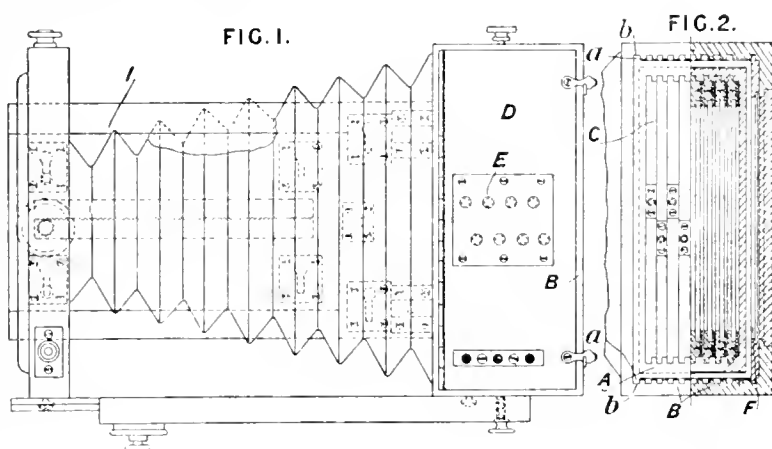
to be exposed. To prepare for a second exposure, the first film is removed and placed at the back of the pile through a door *f* at the back of the slide, the screen is placed under the next film, and the dark slide is closed by means of a hinged open frame *h* for holding the edges of the film in position, the changes being effected while the dark slide is laid on the bottom of the box *a*. For transport, the camera may be packed in the box. The box *a* may be employed as the camera, the focussing being effected by sliding the tube carrying the lens. The opening of the sleeve for the introduction of the hand into the box *a* is provided with a hinged flap or shutter to exclude more completely the light. The dark slide *e* may have a sliding shutter like an ordinary dark slide, or may be used in an ordinary camera, or in conjunction with an ordinary dark slide, the manipulation of the films or plates in the slide *e* or from the slide *e*

to the ordinary dark slide being conducted in a dark bag, box, or room. Plates may be used instead of films.



4970. Clark, A. M., [*Enjalbert, E.*]. Nov. 12.

Cameras; dark slides.—A camera especially suitable for groups, landscape, and other outside work, is provided with an apparatus carrying several plates all ready for exposure, which takes the place of the ordinary dark slide. This plate box *A*, Fig. 2, is fitted to slide light-tight in and out through an opening at the side of the body *B* of the camera, and has lugs *a* at top and bottom which slide in grooves *b*. The outer end of



the box is closed and provided with a handle. All the plates face the lens, and each is carried in a separate frame. Each frame *C* slides in the box, and the frames collectively fill the box, which is open at one end, so as to exclude light. The plate box with its contents may be drawn out at one side of the camera, though stops prevent its entire removal that way. At the opposite side of the camera, in the door *D*, Fig. 1, there are screws *E* which may be individually screwed into the frames *C* so that a frame so held retains its position at the back of the camera, while the plate box, with all the other frames, is drawn out of the way. The screws are furnished with springs to prevent them from accidentally engaging with the frames, and with collars to limit their movement. The focussing-screen *F* fits in grooves in the camera, and may be made to correspond in position with any plate; but the back and front of the camera are connected by a graduated slide *I*, so that, having focussed for any plate, the lens may be shifted so as to get the image exactly on any other plate.

5177. Le Moussu, B. C. Nov. 26. [*Provisional protection only.*]

Photo-mechanical printing.—Photography is employed in combination with the photo-embossed tint process described in Specification No. 3570, A.D. 1881. A stipple effect is produced either on the negative or afterwards. Albumenized paper is exposed under the negative, rolled with greasy ink, and is then developed in water, the ink being washed away at those parts not fixed by the light. This proof is pressed on a grained surface, and a light dry proof is next taken on the surface prepared in accordance with the above-mentioned Specification, and over this is printed "a tint which is pressed across afterwards." The work is then completed by the artist. The embossed tint surface can also be prepared like the ordinary transfer paper for direct transfer for lithography or zincography.

- 5181. Simmonds, R.** Nov. 28. [*Provisional protection only.*]

Lamps, actinic.—A lamp is arranged to give diffused effects without the use of reflectors. A large rectangular metal lantern, having the front and sides of glass, is fitted internally with three cups in which a pyrotechnic composition is burned. The cups are arranged at different heights, the highest being nearest to the camera for portraits.

- 5368. Mucklow, J. D., and Spurge, J. B.** Dec. 8. [*Provisional protection only.*]

Photometers and actinometers.—In a photometer, actinometer, or sensitometer, the light is caused to pass through tubes; at one end of each is a stencil plate and at the other a diaphragm with the required aperture. The apertures of the diaphragms vary through the series according to the ratios required. The film or other material to be tested is placed below the stencil plate, and covered in to exclude extraneous light.

- 5448. Morgan, W. T.** Dec. 13. [*Provisional protection only.*]

Sensitized films; producing magic-lantern slides; producing transparencies; negatives for photo-mechanical printing, producing.—Relates to the preparation of paper supports for gelatino-bromide emulsion and to the formation of blocks or tablets of the prepared sheets. Fine paper is first treated with dilute sulphuric or other acid and washed. It is coated with a mixture of ground asbestos, talc, or such substance, and gelatine, starch, or an equivalent, dried, and pressed between steel or silvered plates. It is then coated again but with a less dilute mixture, dried, damped at the back, laid face downwards on a warm polished metal plate, and heavily pressed to glaze it. It is then polished by rubbing with an alcoholic solution of wax or similar substance, and coated with gelatino-bromide emulsion. Pictures produced on it may be afterwards transferred to glass, canvas, opal, wood blocks for engraving, or to any other substance to which it is possible to attach paper. A block like a sketching-block may be prepared, interleaved with tinfoil. These blocks may be rounded to follow the concave image produced by the lens. After exposure in the camera, the front sheet is removed, and so on. The pictures may be transferred from the sheet to a surface prepared with alumed gelatine. For magic-lantern slides, the curved pictures may be transferred to curved glasses like clock glasses, so that definition is improved at the edges of the enlarged picture.

- 5462. Banzie, E. T. de.** Dec. 14. [*Provisional protection only.*]

Lamps, actinic; lamp reflectors.—A large lantern for use with magnesium lamps is constructed with glazed front and sides and with its other inner surfaces covered with reflecting-material. Its top and bottom are made to diverge towards the front, the bottom being made to swing on centres. Other reflectors are attached to the sides. Inside there are one or more lamps in which magnesium or the substance known as "heliopyre" is burned. The lamps are at different levels, the highest being nearest the sitter's head. A chimney is provided for the escape of fumes, and perforations at the bottom for the escape of ash or unburnt particles.

- 5522. Bonneville, H. A., [Wolff, M. G.].** Dec. 17. [*Provisional protection only.*]

Ornamenting by photography; colouring; chromo-gelatine process.—In a process for obtaining vitrifiable monochrome or polychrome photographs to be transferred to porcelain or other articles to be decorated, the printing-paper is prepared with fish glue, gelatine, vitrifiable colour, and water, and is sensitized in a solution of an alkaline bichromate. Alcohol may be added to facilitate the drying. After exposure to light through a negative the proof is placed in water and on a temporary flexible support, or for certain surfaces the photographic image is conveyed by a pellicle of gold-beaters' skin prepared with stearin, or of collodion. The developing is done in warm water and the final washing in cold water. To remove the bichromate the proof is dipped in alcohol containing a little hydrochloric acid, and it is then placed in a weak alkaline bath to neutralize the acid. The surface of the article to be decorated is coated with a compound of fish glue, gelatine, finely-pounded flux, and water. The conveying-paper is removed after drying, and the photograph is vitrified in a muffle furnace. Polychrome objects are reproduced by placing coloured papers under the plate either on the temporary support or on the article to be decorated. A monochrome photograph may be placed over the coloured photograph. The proofs are touched up on the support by means of mineral colour prepared with gelatine &c. and rendered insoluble by an alum solution, or the colour may be prepared with turpentine and have a gelatine coating.

- 5598. Lawley, W., and Starnes, H. S.** Dec. 21. [*Provisional protection only.*]

Cameras.—An instantaneous camera is fitted with internal receptacles for plates, and separate focussing and dark slides are dispensed with. An adjustable frame, having inwardly-projecting corner pieces rabbeted to receive the plates, is situated about the middle of the camera, the frame being locked in position by means of a screw, and

provided with a spring clip to hold the plate. The focussing-screen, which is held in a clip against the camera side, is placed in the frame while focussing. The plates are laid in receptacles in the camera bottom with blotting-paper &c. between them, and are moved from one receptacle to the

frame and then to the other receptacle by the hand, which is passed through a door in the back of the camera and a sleeve of an india-rubber coated fabric &c., which closely surrounds the wrist. The plate receptacles are closed by spring sliding shutters.

A.D. 1882.

398. Moss, J. M. Jan. 26.

Photo-mechanical printing.—The picture, pattern, or design, if of a suitable size and opaque nature, or a suitable copy thereof, is placed in a printing-frame upon a sheet of paper, cloth, thin metal, or other tissue, covered with a layer of gelatine, gum, starch, or other substance, rendered sensitive by treatment with potassium bichromate, ammonium chromate, or otherwise. Preferably, fine calico, thickly coated with gelatine and sensitized by immersion in a solution of potassium bichromate, is used. After exposure, the tissue is immersed in water at 60° F. until the salt is dissolved, and the tissue is next placed in a bath of water at from 70° to 90° F. until the unchanged gelatine swells up and forms an image of the design in high relief. The tissue is then partially dried by blotting paper, and placed upon a smooth flat surface till dry. According to another method, the tissue may on removal from the frame be at once immersed in hot water to dissolve the unchanged gelatine away, leaving the changed gelatine in high relief. The tissue is placed relief-face downwards on a suitable plane surface, which has been covered with a fine layer of printing or other suitable ink or varnish, preferably composed of printing-ink and boiled linseed oil. The tissue is pressed down until the parts in relief are coated with the ink or resist, and the inked face is applied to the surface to be etched, engraved, or electrotyped. In the case of a roller or cylinder, the tissue is placed inked-surface upwards on a plane surface, and the cylinder rolled over it, so that it takes the tissue up as it passes over it. The tissue is then stripped off, leaving the copy of the design on the surface, which may be left to dry, or etched at once, or dusted over with powdered asphaltum pitch, or similar substance, which will adhere to the undried ink or varnish, whilst the powder is removed from

the other parts by a fan or by washing. The surface is then heated until the powder retained melts into the ink, and when cool leaves a hard glossy resinous copy of the design upon the surface, which may be engraved, etched, or electrotyped. When a deep etching is required, in order to give the etched spaces a ground to hold the colour, the design is etched to a small part of the depth required, and the surface is then washed and dried, and dusted over with powdered pitch, or similar substance, either fine or coarse, according to the ground desired. The surface is heated, to cause the powder to adhere, and immersed in the bath to complete the biting to the required depth. The acid will bite into the surface only between the granules of powder. The surfaces may be etched with ferric chloride, nitric, hydrofluoric, or other acid or corrosive solution, according to the substance composing the surface.

395. Schroer, R. Jan. 26. [*Provisional protection only.*]

Ornamenting by photography; sensitized plates and films; developing.—Relates to the production of photographs on wood, leather, india-rubber, tissues, stoneware, metals, and other materials by means of a sensitive glue emulsion. The sensitive emulsion consists of a mixture of two solutions, one containing glue, which has been tanned by a solution of alum, also potassium iodide, potassium bromide, and common salt, the other containing silver nitrate. Ammonia is added to the mixture, which is then filtered. Glazed porcelain, stoneware, and like surfaces are heated before the sensitive mixture is applied. Metallic surfaces are coated with a lac which is polished before the emulsion is applied. Wood, paper, and

like porous surfaces are first treated with tanned glue. The image is developed with a solution containing pyrogallie acid, citric acid, silver nitrate, and alum; the image is fixed as usual, and then treated in an alum bath.

565. Cowan, A. Feb. 6. [*Provisional protection only.*]

Plate boxes.—A box used in packing photographic plates is provided with an opening in the lid and with two spring sliding shutters, which are placed one on each side of the opening so that the normal distance between their inner bevelled edges is slightly less than the width of the plates. The plate to be packed is placed above the sliding shutters on a strip of paper which passes between rollers on a hinged frame provided with plungers for forcing the plate downwards into the box. When the plungers descend, the sliding shutters are forced apart by the plate, which is pressed down by the plungers on to a spring-supported platform in the box. The return of the sliding shutters above the plate produces folds in the paper, which are flattened against the sliding shutters by the platform when it rises on the withdrawal of the plungers.

775. Wall, R. T. Feb. 17.

Sensitized films; printing.—Relates to the manufacture of a sensitizing-solution from white pepper or its analogues, to the production of transparent films, and to the manufacture of elastic media for uneven surface printing. In the manufacture of the sensitizing-solution, the white pepper &c. is macerated with ether, turpentine, alcohol, naphtha, chloroform, spirit of tar, an oil, acetic, carbolic, or other acid, a varnish, or other such liquid. A little mastic varnish or oil of turpentine is added to the filtered extract when ether is used, and a little spirit varnish when alcohol is used. A surface sensitized by this solution is exposed as usual and developed by powdered pigments. In the manufacture of transparent films, a thick collodion made of acetic or formic acid, guncotton, and castor oil, with or without Canada balsam, is poured upon waxed glass edged with strips of paper to form a dish, and is allowed to dry in a box. This layer is coated with an ordinary emulsion or with a specially prepared collodion emulsion, and is stripped off the glass when the negative is finished and varnished. A thick ordinary collodion and castor oil may be used instead of the collodion described above. In the manufacture of the collodion emulsion, collodion is made with stated proportions of ammonium bromide, alcohol, pyroxylin, and ether together with two or three drops of gelatinized hydrobromic acid, and the emulsion with silver is formed by adding silver nitrate solution and then alcohol. After allowing the solvent to evaporate, the mass is broken into pieces and covered with water for some time. The whole is then poured into a calico bag which has been previously washed in carbonate of soda, and

the bag and its contents are then boiled in a solution of gelatine in water. After removing all traces of acid by washing, the water is wrung out and the emulsion is dried, the emulsion being finally mixed with ether and alcohol. The collodion emulsion may be also formed by adding silver nitrate solution to a mixture of ammonium bromide, glacial acetic acid, pyroxylin, and two or three drops of gelatinized hydrobromic acid; in this case, the solvent is not evaporated. In order to regulate the evaporation, a box is used, the sides of which are covered with fine perforated zinc, fine horse-hair, or fine wire gauze, or with several pieces of calico, holland, or linen which have been soaked in alumed gelatine, whipped, and then dried. In the manufacture of an elastic medium for printing on uneven surfaces, a mixture of stated proportions of gelatine, sugar, glycerine, chrome alum, spirit, and thymol or boracic acid or any preservative agent is poured into a dish formed by glueing a paper strip round the edge of a glass plate. After the mixture is set, a negative film is placed upon it and the whole is placed on a sensitized surface for printing by light in the usual manner. In some cases, the collodion sheet previously described is coated with matt varnish and is drawn upon with pencil, charcoal, chalk, &c. It is afterwards printed on.

820. Vickers, T. Feb. 20. [*Provisional protection only.*]

Shutters.—A shutter for an instantaneous camera consists of a box or casing fitting on the outer end of the lens of the camera and provided with two slides which jointly cover the lens and are retained in position by springs or elastic bands. The slides are drawn aside in opposite directions by a cord, and, when the cord is released, they spring together again. The slides may be flexible and rolled upon rollers and may be worked mechanically, electrically, or pneumatically. Only one slide may be employed.

1621. Addenbrooke, G. L. April 4. [*Provisional protection only.*]

Shutters.—Relates to a clockwork arrangement for regulating exposure shutters, and is preferably applied to a shutter made as a closed flat box, with a hole through the lower part for the lens, and containing two slides within, either of which will cover the lens, one being kept at the top of the box and the other at the bottom of the box by springs. To set the shutter, the lower slide is drawn up and the upper slide down, and each is retained by a catch. The clockwork causes a disc to revolve in a specified fixed time, and two projections on this disc liberate the two slides respectively; first the lower one is released, opening the shutter, then the upper one is set free and closes it. The interval between releasing the two slides may be regulated by placing the projections at the required distance apart. The clockwork is similar to the striking train of a clock, and it has a long

spring wound up by one turn, the barrel of which is geared on one side to a revolving fan and on the other by means of a cog-wheel and its arbor to the disc mentioned above.

2156. Wirth, F., [Meisenbach, G.]. May 8.

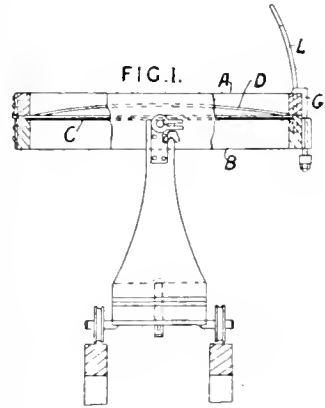
Photo-mechanical printing; printing.—To produce hatched printing-surfaces and prints, a transparent plate is hatched or stippled and placed face to face against a transparent positive, and a negative is photographed from the combined plates. The hatched plate may be moved one or more times while taking the negative to obtain cross-hatched or broken shading. For making a typographic block, this negative is transferred to a plate, which is graved or etched as usual. For making engraving-plates the negative is transformed into a positive, which is transferred to the etching-plate. The negative produced from the combined plate may also be used for the production of photographs and photo-lithographic plates. The object and hatching may be photographed on one plate, which may be used directly for the production of an engraved plate.

2277. Haddan, H. J., [Godard, E.]. May 15.

Ornamenting by photography: positives, producing directly.—Relates to a photographic process for the reproduction of drawings &c. by means of vitrifiable colours on glass for stained glass windows. The process is also applicable to the treatment of wood, marble, stone, earthenware, porcelain, copper, iron, and paper or canvas prepared for oil painting. The drawings are executed on white or bluish paper, which is afterwards rendered transparent with petroleum, and the pieces of glass are cut as usual and placed on the reverse side of the paper. One face of the glass is brushed over with a sensitizing-solution containing ammonium bichromate and dextrin or glucose, and the coating is then dried by placing the pieces in a heating-chamber at a regulated temperature. The exposure of the sensitive surface under the drawing may be performed in a suitable photographic printing-frame or between two sheets of plate glass. The exposure is continued until the prepared vitrifiable colour when strewn over the sensitive surface by means of a brush adheres only to the shade portions of the picture; this operation develops the picture on the glass. The prepared glass is then dipped into a bath of nitric acid and wood-spirit so that the glucose and bichromate are removed. When dry, the picture may be retouched by hand, and the application of coloured enamels and the heating are then proceeded with as usual.

2403. Justice, P. M., [Street, G. S.]. May 22.

Printing; copying drawings.—A frame for ordinary photographic printing or for blue printing consists of two equal parts A, B, hinged together, the part B being rabbeted to receive the glass C, which is secured by strips of tin driven into the frame and bent over the glass. The frame A carries a pressure cushion D formed of two sheets of



india-rubber, or one sheet of flexible material secured to a backing of zinc, tin, iron, wood or other material. The cushion is filled with air, water, or other liquid, and may be fitted with a safety valve. The two frames are held together by clamps G which are turned through a right-angle to release the frames. The clamps then fall below the level of the glass, allowing the tracings and paper to be inserted. The frames are pressed together by levers which act on the clamps, the ends of the levers being held by a spring catch. The pressure is adjusted by nuts on the ends of the clamps. The frames are held in the open position by quadrants L which have spring thumb-catches. At each end of the frame is a box, provided with a lid, for holding tracings which, on account of their length, have to be printed in sections. The printing-frame may be mounted on a carriage. Small frames may be pressed together by hand and secured by catch springs.

2780. Morgan, W. T., and Kidd, R. L. June 13. [Provisional protection only.]

Sensitized plates and films; enamelling; photo-mechanical printing; producing magic-lantern slides; ornamenting by photography.—Relates to the preparation of paper for supporting sensitive gelatino-bromide emulsion, and to the formation of the paper into blocks or tablets, and to the manufacture of a gelatine support for the film stripped from the paper negative, for printing without double transfer. The paper is first treated with sulphuric acid to remove any traces of lime, and then coated with an emulsion of ground asbestos, talc, Chinese clay, or other substance in a solution of gelatine, gum, and alum; it is then dried and rolled between steel or silvered plates; then a second coating is applied, and the paper is then glazed or enamelled by rolling between the polished metal plates. The paper is further polished with beeswax or similar material and then coated with the sensitive emulsion. Blocks of the paper are prepared, interleaved with tinfoil, the exposed

sensitive surface being curved to coincide with the focal surface of the image in the camera in which the paper is exposed. After an exposure, the exposed sheet is detached and developed, the developed film being then transferred to glass, canvas, opal, wood blocks for engraving, and for other purposes, such as decorative papers for windows, walls, panels, and the like. For producing enlarged pictures or for lantern slides the transfer is made upon curved glass surfaces. In printing from this film, to avoid the double transfer, requisite when glass is used to prevent reversal of the image, the film is transferred to a thin transparent gelatine film which can be printed from either side. The film is prepared from a solution of gelatine, bichromate of potash, and ox-gall, which is poured on a glass plate to a uniform thickness by pasting paper round the edges of the glass plate to form a trough. The bichromate salt is washed out and the composition allowed to dry, after which it is stripped from the support.

3013. Lake, H. H., [*Irlande, E. J.*]. June 26. [*Provisional protection only.*]

Ornamenting by photography; varnishing.—In ornamenting the surface of earthenware, glass, and the like, a coloured carbon print is applied in the dark to the surface, which is previously gelatinized in a cold bath. The paper is developed in the dark by treating it with hot water, which leaves the impression adhering to the surface, the picture being enclosed in a thin coating of gelatine. The picture is protected by a layer of boiled oil or oil-varnish and alcohol, spread by a brush, and heated in an oven, kiln, or furnace to harden it. The pictures may be coloured prior to applying the varnish. The surfaces are then treated with pumice.

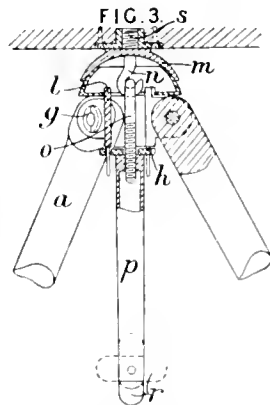
3035. Hare, G. June 27. [*Provisional protection only.*]

Cameras.—A portable folding camera consists of a back frame connected by a bellows body to the front. The base board is hinged to the bottom front edge of the back frame, and is angled at its rear edge to enable the plate to be fixed at any angle. The base board and back frame are held at the required angle to each other by a link at one side of the camera, the link being pivoted at one end to the base board and provided at the other end with a pinching screw running in a slot in the back frame; a notch is made in one side of the slot to indicate when the parts are at right-angles. The other side is held by means of a bracket hinged to the back frame and extending forwards nearly to the front of the base board, where it is held by a clamp screw in the base board. The front of the camera is guided by a plate working in a groove in the base board, and is moved by racks and pinions. The guide-plate may be clamped by a thumb-screw acting on a plate or runner on a slide working in the base board. When the camera is folded down against the back frame,

the bracket may be folded over it and held by a hook or catch. The bracket may be replaced by a pivoted link and pinching-screw.

3232. Plücker, J. F. July 7.

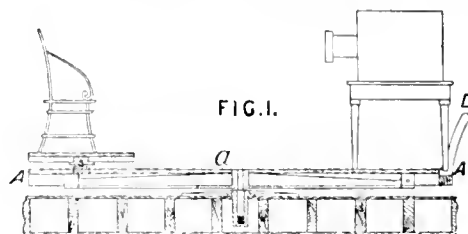
Tripod stands.—The legs *a* are made of brass or similar tubing, each in several pieces sliding one within the other. The lower end of each section, except the innermost one, is split and has a collar that may be tightened by a screw to retain the tube within. The feet have ears that serve to draw out the tubes. Each leg is pivoted between loose ears *g* at the top of the stand. The screw *s*, to which the camera is fixed, projects upwards from an inverted cup *m*, which moves on a ball, and is kept in position by a hook and eye *n, o*. The screwed stem of the eye *o* engages with a screw in the upper end of a tubular stem *p*, which bears against a plate *h* and is turned by a crosshead or thumb-piece *r*.



3268. Stanley, W. F. July 10. *Drawings to Specification* [*Provisional protection only.*]

Cameras.—A scale is attached to the sliding part of a camera for indicating when the focussing is correct for the distance at which the object is placed, and also for indicating the proportional size of the image. The scale may be arranged on a dial which is revolved by a rack and pinion or otherwise when focussing. The camera stand is arranged so that the camera can be moved to adjust finally its distance from the object.

3491. Colton, E. G., [*Kurtz, W.*]. July 22.



Lighting-arrangements; studio accessories.—In an arrangement for modifying the lighting in portraiture, the camera and sitter are mounted at

opposite ends of a platform A, which is turned partly round during exposure. The platform may be mounted on a centre pivot *a*, or on a pivot at one end. One or both ends of the platform may run on guides. The sitter's chair is mounted on a rotary platform at the end of the main platform. The main platform may be turned by a lever D, or by pneumatic, hydraulic, or other appliances.

3889. Edwards, E., [*Rouaix, P.*]. Aug. 15. [*Provisional protection only.*]

Cameras; sensitized plates; developing.—A camera for wet-plate work is combined with sensitizing and developing baths. The camera is extended behind the place for the focussing-screen, and at the back there is a door to be opened for focussing, &c. Against the underside of the camera top there is a horizontal slide which can be moved backwards and forwards, between two stops, and from which the focussing-screen and sensitive plate hang in turn. The plate, coated with iodized collodion, is secured by a groove and spring to the slide and pushed into position. The silver bath is then raised through an opening in the bottom of the camera, in which it slides up and down so that the plate is immersed. The bath is lowered, the exposure given, the slide drawn back to the back stop, where the plate is over a developing-bath, and the bath is pushed up so as to immerse the plate for a sufficient time. The plate is then removed from the camera. The baths may have water-tight covers and they can be removed for cleaning, &c., through openings closed by covers.

4562. Philippi, L. H. Sept. 25.

Photo-mechanical printing.—Relates to processes for producing etched plates in relief with design lines of an uniform depth. A corrodible metal is placed or deposited upon a resistant base, and is covered with etching varnish, gelatine, or printing-ink which is removed where the plate is to be etched. The plate may be coated with sensitized chromo-gelatine, or asphaltum, a photograph being produced by exposure and development in water; or the design may be printed in ink upon the corrodible metal. The plate is then treated with etching-acid which etches completely through the corrodible layer to the resistant base.

4564. Unger, J. Sept. 25. [*Provisional protection only.*]

Tripod and like stands.—The head of the supporting pedestal of camera stands &c. has a cap carrying ears for hinge pins and quadrant guides. In the ears are hinged the butts of three or more upwardly-projecting arms, having at their upper ends antifriction rollers bearing in spiral grooves in a plate beneath the head. Springs force the

arms inwards. When the elevating-screw is turned to raise the head, the arms come somewhat together with the rollers in the groove, and serve to support the head. When the head is lowered, the supporting action is the same, but the arms are forced back and the rollers leave the groove.

4651. McLellan, J. Y. Sept. 30. [*Provisional protection only.*]

Lamps, actinic.—In a magnesium lamp, in which the metal burns in oxygen, a glass globe is mounted on a cylindrical reservoir, and the two are connected by pipes with stopcocks. The globe is filled with oxygen from the reservoir, by filling the globe with water through an opening in the top, closing the opening, and making connections with the reservoir. A suitable length of magnesium wire is ignited and introduced into the globe through the opening at the top.

4671. Evans, C. P. Oct. 2. [*Provisional protection only.*]

Producing photographs of special character; ornamenting by photography; statuary, facilitating production of.—An object or person is photographed direct on to a glass, china, earthenware, papier mâché, or other similar bust or image which has been prepared with a white surface, the bust replacing the negative plate in the camera. To facilitate adjustment the bust is held from the top of the camera on a sliding cover, and it is raised or lowered by means of a screw.

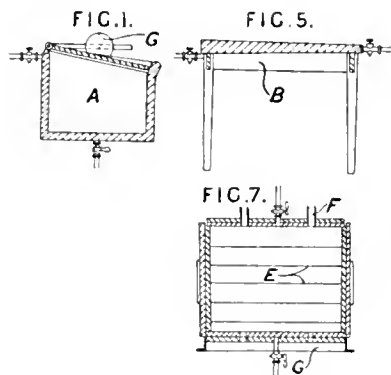
4747. Emery, F. J. Oct. 5. [*Provisional protection only.*]

Producing photographs of special character; photo-mechanical printing.—In a modified form of Niépce's heliographic method of engraving, a fatty or waxen image is transferred to the bitumenized metal surface to soften the protected parts while protecting them from the action of light, so that a shorter exposure suffices. The image may be transferred in a similar manner to the transference of a typographic, lithographic, or plate impression to stone, or it may be written on tracing-paper, talc, sheet gelatine, or other transparent material, or it may be written or drawn directly on the bitumenized surface. The ordinary colour used by potters in printing from copper plates is preferably used for the fatty material, and is placed on the usual potters' transfer or tissue paper. The bitumen is rendered insoluble by exposure to light, the protected parts and the fat are removed by turpentine, benzene, or other solvent, and the etching is then performed to the required depth.

5086. Brown, R., Barnes, R. W., and Bell, J. Oct. 25. *Drawings to Specification.*

Photo-mechanical printing.—Relates to the production of lead plates from gelatine reliefs, for Woodburytype or other printing, by means of a roller press. A sheet of lead has on each side of it first a sheet of steel and next a sheet of cardboard. This arrangement is passed through a spring roller press, adjusted so that its rollers cannot be brought nearer than a certain suitable distance. When the lead plate is as far reduced in thickness as the adjustment of the press will allow, the gelatine relief is placed between the lead plate and one of the steel sheets, and the arrangement is again passed through the press. The lead plate may be printed from with gelatinous inks. For use with fatty inks, a grained surface must be obtained, to which end a gauze or perforated sheet may be placed between the positive and gelatine during exposure, so that the gelatine relief has a grained surface. Or the grained surface may be imparted to the lead relief after it has been prepared as above described, by putting a sheet of fine wire gauze, muslin soaked in glue and dried, sand paper, or their like on the lead plate, covering it with a soft material such as cloth, adding the steel and cardboard sheets, and passing the arrangement through the roller press, using a light pressure.

5131. Lake, H. H., [Chaine, J., Durand, A., and Chaligny, S. de]. Oct. 27.



Colouring.—Consists of a process and apparatus for producing permanent coloured photographs by applying oil colours to the backs of the photographs which have been previously rendered transparent. A bath A, table B, and an oven E are used, each of which is heated by a jacket for hot water, steam, or a hot gas, &c. The photograph is first introduced into the bath A, which contains the liquid designed to fix the image upon the photograph and render it transparent. The bath cover has an india-rubber sheet, between which and a rounded edge of the bath the photograph is withdrawn to remove as much of the liquid as possible, the cover being pressed against the edge

of the bath by an adjustable weight G. The photograph is then placed upon the hot table B and the liquid is completely removed by wiping. After exposure to the air for a few minutes the photograph is ready for the application of the colours. The coloured photograph is then placed in the oven E where the paint is dried in a short time, and, by a slight fusion, the most intimate combination of the paint and the material of which the photograph is composed is brought about. The photograph is pressed and finished as usual. Tubes F, G allow air to circulate through the oven, and perforated shelves are provided to receive the photographs. The underside of table B is inclined to allow water of condensation to drain off.

5933. Frank, R. E., [Micciullo, L., known as Scotellari, D.]. Dec. 12.

Ornamenting by photography.—Relates to the ornamentation of glass and consists in a process for producing pictures, patterns, or designs upon glass, china, pottery, or other substances. The surface is coated with a sensitive varnish composed of an aqueous preparation of gelatine, gum-tragacanth or gum-arabic, quince seeds, and a chromate; sugar, glucose, or honey may be used in addition to, or instead of, the quince seeds. The coated surface is exposed under the transparency, and the colours or enamels are dusted on by a brush. The surface is then protected by a coat of thick turpentine and immersed in water acidulated with acetic, hydrochloric, or other acid. The picture is then touched up, if required, and fired. Works of art, such as portraits on glass, may be copied by preparing two plates as above. Upon one of these the colours &c. may be applied, or it may be touched up; after the colours are fired, the second copy is placed over the coloured one in exact register. The two plates are united by framing, cementing, or by flux applied at the edges, so that the two being fused together, form a single piece. This method of uniting the plates may be used for uniting plates produced by other processes.

6034. Thompson, S. P., and Starling, C. C. Dec. 18. [*Provisional protection only.*]

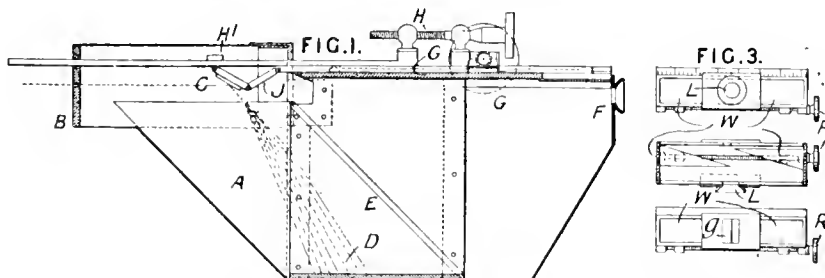
Photometers.—Consists in the use of interchangeable opaque screens in comparing the intensity of light. The screens are formed of two members either plain or coloured, and are attached at any angle to each other and on the horizontal bar of the photometer. The light from the candles is directed upon one face of the double screen, and when measuring rays of a comparatively low intensity, the rays to be measured are directed upon the opposite face of the screen. For measuring lights of a high intensity a mirror is interposed between the source and the screen to reflect the light.

6114. Emmens, S. H., and Munro, J. Dec. 22.

Photometers.—

The light is absorbed by different thicknesses of coloured glass or liquid. In Fig. 1 the ray of light entering at the end B is reflected by a mirror C, and passing through the prism A forms a spectrum on the reflecting screen D.

Between this and the eye-piece F is a glass scale E to measure the parts of the spectrum, and also to gauge its intensity by noting the vanishing points of the lines. To vary the thickness of glass through which the light passes, the mirror C is moved horizontally by a rack and pinion G, and its inclination adjusted by a screw H and rod H' about the centre J. The quality of light is shown by the spectrum. Fig. 3 shows a pocket instrument. Opposite the eye-piece and lens L is a partially transparent window *g*; the light is received through this window through one or two neutrally-tinted wedges W, which are adjusted by a screw R until they are able to absorb the light, or until a wire on the window *g* is not seen. The reading of the scale then indicates the candle-power of the light. If one tinted prism is used, a



second transparent prism may be added to prevent the bending of the ray, and also when used alone to give a spectrum. In addition to the tinted wedges, tinted glasses of known absorptive power are used for strong lights. Two lights can be compared by being reflected by mirrors into the same eye-piece, a wedge being adjusted in front of one until the two images are equal. In another form, the window and the eye-piece are placed at opposite ends of telescopic tubes, which are connected to a reservoir of liquid; the thickness of liquid through which the light passes can thus be varied. In another form, tinted glasses successively diminishing in length or area are superimposed so as to give a variety of thickness. In another form, the light is absorbed by one or a series of mirrors.

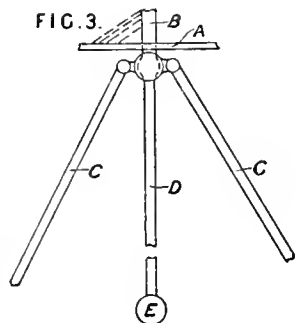
A.D. 1883.

101. Abel, C. D., [Attout, (called Tailfer), P. A., and Clayton, J.]. Jan. 8.

Sensitized plates.—Relates to the application of eosin to plates, in order to reproduce lights and shades correctly in spite of variations of colour. An ammoniacal solution of eosin may be added to the emulsion of gelatino-bromide of silver at the time of coating the plates; or plates already prepared may be treated with an ammoniacal solution to which alcohol has been added. Instead of eosin, other compounds of fluoresceins with chlorine, bromine, or iodine may be used. Other alkalis may be substituted for the ammonia.

393. Beer, A. J. Jan. 24.

Photometers; tripol stands.—Consists of a disc A with an indicator B, supported on the tripol C and fitted with the pendulum D and weight E. The weighted rod works in a socket joint and ensures the constant level



of the plate A on which the shadows from the indicator B are read off.

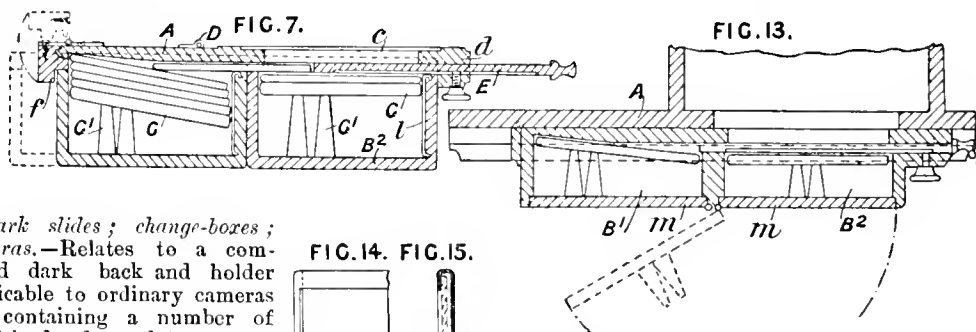
504. Marlow, E. Jan. 30. [*Provisional protection only.*]

Lenses and lens fittings.—As a means for adjusting the focus of a lens, the outer tube of the lens case is provided with a spiral groove which receives a pin fixed to the inner tube, so that the relative positions of the lens part can be varied. The outer tube is lined with velvet or other soft material.

563. Blakely, W. Feb. 1. [*Provisional protection only.*]

Tripod stands for chemical fire-engines. A portable tripod stand having rule-jointed legs, and a loose ring notched to engage the legs and lock them rigidly in position when extended, is fixed to and supports a ring in which rests a canvas basin or bucket with a flanged wooden bottom. The legs are braced by a loose ring dropped down around them. The canvas basin is used to supply the tank of a chemical fire engine.

843. Samuels, T. Feb. 15.



Dark slides; change-boxes; cameras.—Relates to a combined dark back and holder applicable to ordinary cameras for containing a number of sensitized dry plates, automatically bringing them into position for exposure, and for changing and packing away the plates after exposure. The base-plate A, Fig. 7, of the holder has rabbeted guides at the top and bottom engaging grooves in two boxes B¹, B², which form respectively a receiver and container for the plates. An opening c in the plate A permits the exposure of the plates, and fillets d fitting grooves in the back of the camera make light-proof joints. The boxes are secured in position by means of spring catches and a hinged flap f; they are open on the side next to the plate, and are fitted with false backs G acted upon by springs G¹ to press the plates forwards. Wires l guide the plates, and the forward motion in the container is limited by stops or tapes. After each exposure the shutter E is moved inwards to pass the exposed plate to the receiver. The plate A is cut away at one end to cause the exposed plates to take up an inclined position, so that each plate in passing to the receiver takes the front position. When the receiver is full, the shutter E is withdrawn, a cover is inserted and is pushed along, by means of the shutter, into grooves in the receiver to close it. The plate A is hinged at the part D to the back of the camera; it is turned to a position parallel to the side of the camera during the focussing operation, and is locked in position for exposure

by a spring catch. In the arrangement shown in Fig. 13, the board A is fitted with a removable box having two compartments B¹, B². The receiver is closed at the front, the container is open, and each has a hinged back m. The plates are changed as before by means of a shutter. The box slides between guides in the back of the camera to facilitate focussing, or may be hinged. Each plate is encased in a metal or vulcanite sheath s, Figs. 14 and 15, flanged at the top and bottom and provided with a turned-up edge s¹ acting as a stop. The inner surface of each sheath is coated with a non-actinic varnish. According to the Provisional Specification the exposed plates in the receiver may be canted by means of a lever when the next plate is to be inserted.

896. Mehe, J. R., [Allgeyer, J., and Bolhoe-
vener, C.] Feb. 19.

Photo-mechanical printing.—Relates to means for producing printing plates or blocks by photographic means. A heliotype plate is prepared as usual, except that chloride of calcium or an equivalent substance is added to the gelatine to get a grain. The heliotype-plate is exposed to light under a dia-positive, rolled over with greasy ink and the image is either immediately strengthened by strewing graphite powder or some other suitable coating over it, or an impression is made from it on a gelatine foil, which impression or copy may also be strengthened in the manner just described. By either method a grained

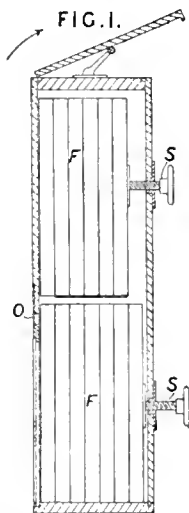
negative is obtained which in one case is right-handed and in the other case left-handed. A film prepared with glue, glycerine, and bichromate of potash is exposed under the above grained negative. The film is then fastened by its back to a wood block of the usual type height, and the relief is produced by moderate damping and friction. Such a relief, or an electrotype made from it, may be printed from in combination with ordinary type. The films are prepared by casting on a smooth glass plate previously coated with ox gall. When cool, the surface is scraped level; the film is then stripped from the glass, and the surface which was towards the glass is exposed as above. The films may be exposed under line negatives.

941. Clark, A. M., [*Meyer, G.*] Feb. 20.

Colouring.—Relates to the preparation of fire-proof colours and inks, stated to be applicable for use in photography. The pigments, comprising artificial ultramarine, natural or calcined earths, &c., are made up with plain or distilled water, sugar, silicates, glycerine, borax or boracic acid, oils, &c. For producing water colours for the same purpose, colours such as those applied upon or under the glaze in the decoration of crystal or ceramic ware are employed.

1007. Hare, J. H., and Dale, H. J. Feb. 24.

Change-boxes.—The plates are mounted in frames F, Fig. 1, having rabbets against which the plates are pressed by a back-plate secured by turn-buckles. The frames are placed in the box in two tiers, the lower containing one more than the upper, and they are held in place by screws S. The front of the box is provided with a sliding door which is drawn up to expose the front plate as shown. To change the plates, the screws S are drawn back and the box turned in the direction indicated by the arrow, thereby allowing the front frame of the lower tier to slip into the upper tier. On completing the turn of the box, the frame which was the rear one of the upper tier slides into the vacant place at the back of the lower tier. The number of the front frame is exposed through the opening O.



1061. Lake, W. R., [*West, R. B., and West, B. C.*] Feb. 27.

Printing; developing.—Printing paper is sensitized in a bath containing potassium bichromate, magnesium sulphate and mercuric chloride. After exposure under the negative it is soaked in water and then, if pure whites are wanted, in acid sulphite of sodium, and developed in a solution containing gallic acid, ferrous sulphate, alum, and sodium hyposulphite. After development, it is soaked in water acidulated with acetic acid, dried, mounted, &c. Any colour from black to brown may be produced, after soaking out the developer, by applying the diluted sensitizing-bath. For reddish brown, after development a solution of sodium carbonate is applied; to bleach, citrate of ammonia is used. The paper for sensitizing may be prepared by any known process, but a coating of starch, sugar, glycerine and caustic potash is preferred.

1095. Tattersall, J. W. Feb. 28. [*Provisional protection only.*]

Washing.—Photographs on paper and glass are washed by water spray, brought into direct contact with them, the photographs being supported on trays; or the trays may be below the outlet for overflow in the casing in which the washing is effected. The water spray is produced by jets in connection with supply pipes.

1229. Dawes, A. H. March 7.

Colouring; mounting prints.—A photograph on paper is reduced in thickness, if necessary, and soaked in a bath of oil, varnish and spirit. The surplus liquid is removed, and the translucent picture is coloured on its back, with preferably oil colours. The mount of paper, card, &c., is, preferably, coloured to match, and when both have dried to a certain consistency, they are placed together, paint to paint, and are pressed between polished surfaces with a gradually increasing pressure till thoroughly united. The surface may afterwards be enamelled or varnished.

1380. Brown, R., Barnes, R. W., and Bell, J. March 15. *Amended.*

Photo-mechanical printing; finishing; printing.—Relates to means for producing grained and lined printing-surfaces and photographs and also to means for straightening leaden printing-surfaces which may have got bent during their preparation by pressure against gelatine reliefs. The half-toned picture or photograph has a grained or lined surface given to it by roughening or abrading the surface, or by pressure against a gelatine relief, wire gauze, or perforated metal, or against a grained or lined steel plate, stone, or similar surface. The picture is afterwards rubbed with a soft pigment to show up the effect. The

graining or lining may be printed on from a copper plate or its equivalent. A picture so prepared is submitted to artistic manipulation and can then be used for preparing printing-surfaces by any known process, such processes having been usually confined chiefly to reproducing from what are technically known as point pictures. The production of the grained or lined surfaces as above described by pressure, is also applicable for treating ordinary photographs. Or a finely grained or lined paper or other material or a substance that naturally has a grained or lined surface, as leather or linen, is photographed. The surface to be printed is exposed under this negative, and under the negative of the required subject, either negative being employed first: or the two negatives may be placed together and used simultaneously. Instead of the former negative, fine wire gauze or like perforated material may be used, and it may be used either before or after the negative of the subject. Or the sensitive paper may be printed with lines or dots, either before or after it is sensitized, the subject being then printed on the sensitive paper. Or a gelatine relief of a grained or lined surface and a gelatine relief of the negative picture may be produced. These reliefs are placed one over the other on the metal surface, and pressure is applied, as in the Woodbury process or its modification described in Specification No. 5086, A.D. 1882. In applying these last named processes to a lead plate of large size, the plate may get bent or uneven. The plate is straightened again on a surface, such as a steel face-plate, heated by a gas flame or in an oven.

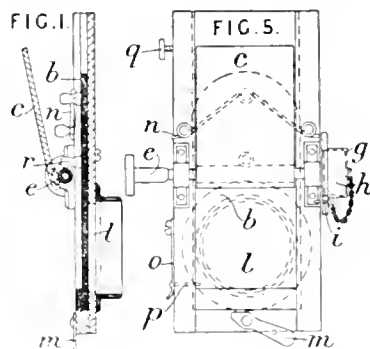
1608. Brandon, R. H., [*Thiebaut, A. C. A.*]. March 30.

Sensitized films.—Relates to the preparation of gelatino-bromide films on paper in such a manner that they can be stripped dry without the assistance of any solvent. A gelatinized sheet of paper is damped and attached to a sheet of glass by paper bands round its edges so that in drying it is stretched flat. It is coated, first, with ordinary collodion containing about two per cent. of "azotic cotton" and about two per cent. of castor oil, and, when dry, with gelatino-bromide emulsion. After slow drying, the paper with the film is detached from the glass, and is exposed, developed, and fixed as usual. The film is peeled off the paper by hand and can be used immediately for printing with either face downwards.

1650. Reynolds, R., and Branson, F. W. April 2.

Shutters for instantaneous cameras. In the arrangement shown in Figs. 1 and 5, the flap and drop portions can be timed independently of each other. The flap *c* is carried by a spindle *e*, and it is raised from the lens aperture *l*, when the catch *m* is released, by a coiled spring *h* contained

in a box *g*, which can be turned on the flap spindle *e* in order to wind up or unwind the spring. A pin *i* holds the box *g* in any position to which it is adjusted. The drop *b* is moved across



the aperture *l*, when the flap has passed through about five-sixths of its movement, by an india-rubber band *n*, the tension of which may be varied to suit the rapidity of the motion. A stop *r* covered with india-rubber serves to arrest and cushion the fall of the drop *b* against the boss of the flap *c*. A pin *p*, on a spring *o*, enters a recess in the drop and prevents it from rebounding. The set-screw *q* retains the drop in the raised position when it is not in use.

1960. Robey, G. April 18. [*Provisional protection only.*]

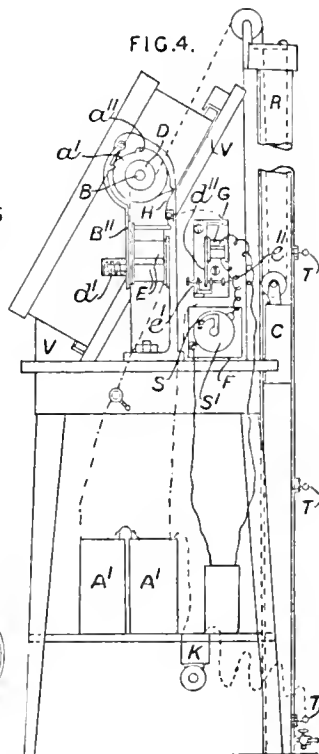
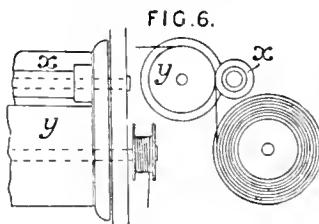
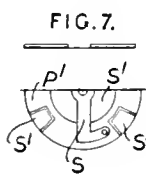
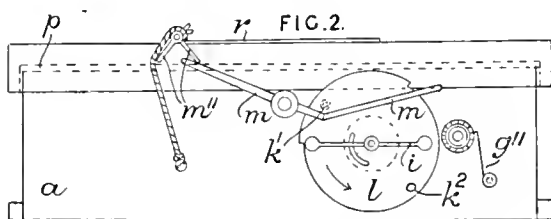
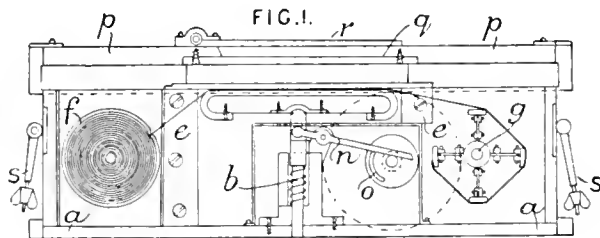
Enamelling; colouring.—Relates to a process for enamelling water-colour or oil photographs. A glass plate is prepared with powdered talc, coated with collodion, dried, immersed in cold water, and brought into contact with the face of the print which has previously been saturated with a gelatine and chrome-alum solution. The two are allowed to dry, and the paper on the back of the photograph is removed by powdered pumice, leaving the photographic film on the glass. The back of the film is then coated with castor oil to render it transparent, and finally with benzene in order to remove the grease; colour is then applied to it. The enamelled film is stripped from the glass and mounted as usual.

1971. Cooke, W., [*Schlotterhos, R.*]. April 18.

Printing; copying documents, drawings, and the like; shutters; roller slides.—Relates to apparatus for exposing flexible or elastic bodies such as papers, textures, or gelatine films, to the action of the sun's rays or other agents, such as "an aniline "atmosphere in aniline printing." The apparatus consists of a box *a*, Fig. 1, fitted with a cover *p* which is secured by hinged bolts and thumb-nuts *S*. The cover is provided with an opening under which a glass plate *q* is secured, the opening being provided with frames for varying the size of

the opening. The material to be exposed is carried in a roll case *f*, and passes over a rising and falling table which, by means of a spring *b*, presses the material up against the negative or

plate carried in the removable frame *e*. The material may be covered by a sliding plate so that access may be had in daylight to the plate for changing or for other purposes. The exposures



take place by uncovering the opening by means of a slide, or a curtain, or by means of the hinged cover *r* which is actuated by a three-armed lever *m*, Fig. 2, worked from a disc *l* turned by a handle *i* from outside. The pivot of the cover is fitted with a forked arm *m''* engaged by the lever *m* so that the cover is opened when the projection *k'* on the disc strikes the lever *m*, the material remaining exposed until the second projection *k''* strikes the third arm and closes the cover. An elastic band is provided at the pivot to assist the opening of the cover. As the cover *r* is closed, a cam carried on the disc *l* strikes the lever *n*, Fig. 1, and lowers the table and releases the material which is then wound on the roll *g*; the roll is actuated by toothed gearing from the disc *l*, a detent *g''*, Fig. 2, being provided to prevent the roll from unwinding. For exposing in a camera, the apparatus may take the place of a box, and the lens cover may be operated in connection with the remainder of the apparatus. An automatic exposing-apparatus is obtained by mounting the box in a stand *V*, Fig. 4, at any inclination, and working the disc *l* from a connecting-shaft *B* by a weighted cord passing over a roller *D*, the weight *C* being guided in a tube *R* filled with water, oil, or other retarding substance. The cover *r* is retained in the exposed or closed positions by notches *a'*, *a''* in the roller *D* which are engaged by a detent-lever *B''*. At the

required times the detent-lever is operated by an electromagnet *E* and battery *A'*, the actuating-current being interrupted at the required intervals by a contact-maker *e'*, *e''*, worked by an electromagnet *G* controlled by a clockwork or motor switch. The clock or motor *F* causes a friction-contact *S* to rotate over an insulating disc *P'*, Fig. 7, which covers a contact dial plate *S'*; the disc *P'* is cut out at intervals so that the finger *S* makes contact intermittently with the disc below, thus establishing an intermittent current from a second battery through the second electromagnet *G*. The armature *d''* of the magnet *G* will thus be caused to oscillate between the contact screws *e'* and *e''*, thus interrupting the current from the battery *A'* through the electromagnet *E*, allowing the detent-lever *B''* to be released by the spring *d'*. The cuts in the insulated disc *P'* are arranged to correspond to the durations of the exposures required. In one arrangement when the cover *r* is closed an insulated contact-spring *H* makes contact with a projection on the roller *D*, thus establishing an electrical connection through the roller *D* and the conducting cord and weight *C*. Contacts *T* are provided in the tube *R* so that when the weight comes in contact with any of them the current from the battery *A'* is diverted from the contact-maker *e'*, *e''*, through this circuit and through an alarm bell *K*, so that after a certain number of

exposures the cover *r* will remain closed and the alarm will be rung until the weight is again raised. For rapidly succeeding exposures the weight *C* communicates motion to a press or friction roller *y*, Fig. 6, between which and the friction roller *x* the sensitized paper passes.

- 2316. Mills, B. J. B.,** [*Lumière, A.*]. May 7. [*Provisional protection only.*]

Plate boxes.—Dry plates are preserved, in travelling, by carrying them in boxes made of tin-plate or the like. The plates fit in vertical grooves made of corrugated metal, and the cover is formed with a shoulder so that it does not touch the plates. When the lid is put on, the junction is made tight with cement or a band of cloth or paper.

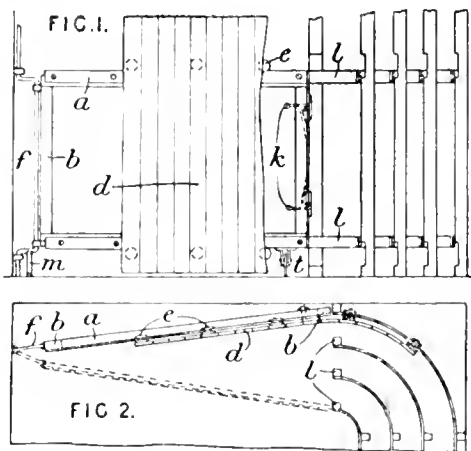
- 2323. Adams, J.** May 8. [*Provisional protection only.*]

Colouring.—In preparing coloured photographic pictures, the photograph is mounted on the back of a glass plate, and its outer surface is painted, after varnishing or otherwise. The entire back is then covered with a mixture of zinc oxide or sulphide and a drying-oil or gum and balsam, and a sheet of pure white cellulose paper is laid on and pressed, in order to draw the liquids from the surface of the photograph, the paper being allowed to dry on. In some cases, the paper is dispensed with, a varnished menstruum being used, which is washed with ether when laid on. The final effect is that of a picture on opal glass.

- 2495. Imray, J.,** [*Cros, C., and Vergeraui, A.*]. May 18. [*Provisional protection only.*]

Printing; developing.—Paper for making prints of tracings &c. is sensitized by mixing a solution containing potassium bichromate, glucose, and water, with the pulp from which it is made, or by coating it after manufacture with a solution containing potassium bichromate, glucose, gelatine, and water. For developing the prints, a solution containing silver nitrate, acetic acid, alcohol, and water is used, followed by treatment with sulphuretted hydrogen, a reducing-salt of copper or iron, such as an oxalate or an ammonio-sulphite, or an alkaline carbonate, to blacken the image. Another developer has lead acetate instead of silver nitrate, and is followed by sulphuretted hydrogen; or an aqueous solution of extract of logwood, potassium carbonate, and alcohol may be used, followed by oxalic acid to clear the colour from the ground. In all these operations, alcoholic liquids are preferable to pure water as they dissolve less bichromate.

- 2677. Clark, A. M.,** [*Lindop, W. E.*]. May 30.



Studio accessories.—Apparatus for changing and storing photographers' backgrounds and other movable scenery consists of a hinged gate *a, b*, Figs. 1 and 2, which may be moved opposite the ends of any of a series of rails *l* arranged along the side of a room or in a semicircle in one corner. The flexible backgrounds *d* carry rollers *e* which run on rails formed by the upper and lower bars of the gate, and the background stored on any of the rails *l* may be run on to the gate. The hinge of the gate is formed by a cranked rod *f* the lower cranked portion of which may be held in position by a notched spring *m*. The lower outer end of the gate carries a supporting-roller *t*, and spring catches *k* hold the gate in position opposite any rail *l*. The gate may be hinged at an intermediate point.

- 3177. Philippi, L. H.** June 26.

Photo mechanical printing.—Relates to printing-rollers formed of photo-engraved surfaces. The photo-engravings, preferably made according to Specification No. 4562, A.D. 1882, or clichés from them, are curved to fit the printing surface. If the design contains several colours there must be a cliché for each colour, obtained as follows:—The original glass negative is used to obtain a number of similar glass negatives, in which are removed by re-touching or covered by colour all those parts of the design which are not to appear in the photo-engraving. The surface of the printing-roller is covered with the photo-engraved plates or clichés. The metal plates cast as in Specification No. 124, A.D. 1882, [*Abridgment Class Metals, Cutting &c.*], may also be used.

- 3362. Wirth, F.,** [*Benecke & Fischer and Frank, J.*]. July 6. [*Provisional protection only.*]

Photo-mechanical printing.—Relates to a method of producing photo-lithographic printing-plates, the

surfaces of which consist of points more or less close together according to the light and shade required in the printed picture. A negative picture of the object to be reproduced is obtained, and this is enlarged sufficiently to show up the grain of the emulsion, in order to produce the dots or points; the enlargement is suitable for the preparation of the design on a zinc plate. The collodion emulsion consists of alcohol, ether, guncotton, and iodide of ammonium; the developer consists of a solution of sulphate of iron, acetic acid, and alcohol.

3476. Brown, R., Barnes, R. W., and Bell, J. July 14.

Photo-mechanical printing.—Relates to improvements in the process for the production of designs by pressure against relief surfaces, described in Specifications No. 2912, A.D. 1878, and No. 3760, A.D. 1879, and consists in means for preventing the obliteration of the design by moisture, avoiding the wear of the gelatine relief, and producing a combined matt and bright surface on thin metal. To prevent moisture from obliterating the designs so produced on paper, the surface is coated before or after the impression is made with a waterproofing solution, such as shellac dissolved in spirit. To prevent the wearing of the gelatine relief obtained by the action of light upon sensitized gelatine in the ordinary manner, metal reliefs are prepared from it, and these only are used. A mould is made from the gelatine relief by pressure on soft metal as lead, or by casting in plaster; and from this mould a relief surface is obtained by casting in stereotype metal, or by making an electrotype and backing it with stereotype metal. The surface of the working relief may be made more durable by electroplating with steel or other metal; or it may be coated thinly with chromated gelatine, giving a surface easily renewable. To produce a combined matt and bright design upon such metal as tinfoil, a relief is prepared preferably on a zinc plate, by coating with bitumen, exposing, developing as usual with benzene, and etching. The plate is cleaned and pressed against the tinfoil, but with a layer of paper or fabric between. The texture of the interposed medium is imparted to the tinfoil only where they are pressed together by the relief surface.

3709. Marra, F. A. July 30. [*Provisional protection only.*]

Colouring; finishing.—For ornamenting the background of a photograph with powdered metal, it is first coated with gold size, carefully following the lines of the picture, and then the metal in a pulverized or flocculent state is sprinkled upon it, pressure being applied to get a uniform coating. Gold, silver, bronze, aluminium, and other metals may be used, and, by the use of two or more different metals, polychromatic effects can be obtained.

3800. Caspar, A. M. F. Aug. 3. [*Provisional protection only.*]

Mounting prints and the like; colouring.—Imitation oil paintings are produced by mounting photographs on canvas and colouring them. The photograph is pinned face downwards on a board, and rubbed thin with glass or sand paper. It is next soaked with water, spread over with gum, paste, or glue, and covered with coarse canvas; the two are then pressed together till the canvas shows through the photograph. When dry the sheet is stretched on a stretcher, and the photograph is painted with transparent albumen colours mixed with water, and subsequently varnished.

3822. Rydill, G. Aug. 4.

Transparencies.—Prints are made translucent by immersion in a warm mixture made as follows. To hot castor oil is added a cement composed of isinglass dissolved in proof spirit or acetic acid, gum mastic, gum ammoniacum or resin mastic dissolved in alcohol, proof spirit, and methylated spirit. When dry the print is varnished, and may be subsequently coated with collodion. Or it may be made translucent after varnishing &c. The print is mounted on translucent paper to form a margin, or the margin may be left in printing by means of a mask. The margin may be printed upon or pierced to form a pattern, and the prepared print is then placed between two sheets of glass which are cemented together at the edges. A second composition for rendering paper translucent consists of olive oil or other vegetable or animal oils or fats, white wax, mastic and copal dissolved in turpentine or alcohol, and isinglass dissolved in acetic acid, together with methylated spirit. Various gums and resins may also be used.

3948. Sachs, J. J., [*Fickeissen & Becker*]. Aug. 14.

Sensitized plates.—Relates to the manufacture of pliable plates or surfaces from paper, cloth, or other fabric, to be used as a substitute for glass in photographic and other processes. The material, preferably paper, is stretched on a frame and rendered transparent by a coating of copal varnish, and when dry is subjected to one or more smoothing operations with powdered pumicestone or by machinery. The material is then covered on one or both sides with a solution of gelatine, isinglass, or other substance, and when dry is further treated with a preparation of ox gall from which the fatty matter has been removed by precipitation with acetate of alumina and by subsequent filtration. The sensitive emulsion may then be applied. The plates or sheets may be used for calico and other printing; for this purpose stipples or lines can be printed on them before they are rendered transparent, so that nature subjects, drawings, or

designs can be reproduced in half tones in lines and stipples available for any kind of printing.

4152. Zuccato, E. de. Aug. 28.

Photo-mechanical printing.—Grained, lined, or stippled prints, for transfer, are produced from gelatine reliefs by pressure of paper or analogous material between the relief or a cast from it and a surface bearing printers' ink in lines, grains, &c. The ink sets off according to the pressure, that is according to the height of the relief. The ink-bearing surface may be a lithographers' stone, zinc plate, enamelled or plain paper, &c. The surface printed on may be paper, metal foil, gold-beaters' skin, silk fabric, &c. The picture so obtained may be transferred to metal or stone, or it may be photographé and a transfer made from the photograph.

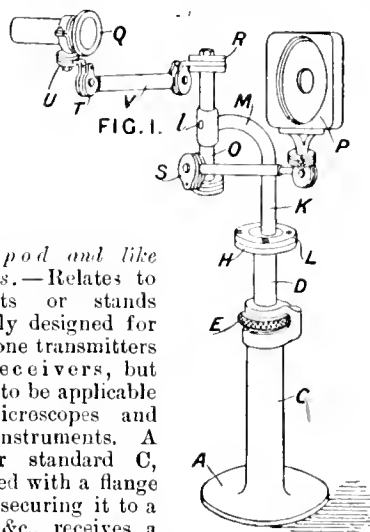
4153. Zuccato, E. de. Aug. 28.

Photo-mechanical printing.—Stippled or lined prints, for transfer, are produced by pressing together paper or analogous material and an inked piece of fine network or other textile fabric, or fine wire gauze, by means of a gelatine relief or a cast therefrom. The fabric used is well saturated with the ink, but carefully, so that none of the meshes or ribs are blocked up. The ink sets off according to the pressure, that is according to the height of the relief. The relief itself may be inked, and then the paper or its equivalent is placed between the fabric and the relief. The picture so obtained is transferred to stone or metal, or a photograph of it is transferred. The stone, zinc, or like surface may receive the stippled picture direct, by laying on it the inked fabric and pressing by the relief. The picture may be produced on paper, metal foil, gold-beaters' skin, a collodion pellicle, silk fabric, &c.

4154. Zuccato, E. de. Aug. 28.

Photo-mechanical printing.—Stippled or lined prints, for transfer, are produced by pressing paper or other suitable material against an inked roughened, grained, stippled or lined plate by means of a gelatine relief or a cast therefrom. The ink sets off in proportion to the amount of pressure, that is according to the height of the relief. The print is then transferred to metal or stone, or a photograph of it is transferred. The surface to receive the picture may be paper, metal foil, gold-beaters' skin, silk fabric, &c. The stippled or lined plate may be a metal plate or wood block that has been grooved or stippled, or a cast from such a block or plate in ebonite, dry gelatine, or celluloid; or it may be a sheet of emery cloth, sand-paper, or book-binders' cloth.

4297. Lake, H. H., [Holden, C. W.]. Sept. 6.



Tripod and like stands.—Relates to supports or stands specially designed for telephone transmitters and receivers, but stated to be applicable for microscopes and other instruments. A tubular standard C, provided with a flange A for securing it to a table &c., receives a screwed tube D, adjustable vertically by means of a nut E, and provided with a circular flange H, on which the flange of a second tube K is secured by a ring L. The tube K can be rotated through nearly a complete revolution, being arrested by pins in the flange and ring L. The upper part M of the second tube is turned horizontally, and carries at its end a vertical cross-piece O, to which the receiver Q and transmitter P are connected by means of two pairs of joints R, S, T, U, and a horizontal telescopic arm V. Each joint is formed of a central plate pivoted between two outer plates. One of each pair of joints is vertical and the other horizontal, to form a universal joint to enable the transmitter and receiver to be moved into any position. Stops are placed in each joint to prevent more than one complete rotation in any direction, thus preventing any twisting of the wires. Washers may be placed between the plates of the joints to prevent them moving too freely. In a modification, the clamps carrying the transmitter and receiver are pivoted in sockets, and several of the joints and the screwed tube D are dispensed with. In a further modification, the tubular standard C, screwed tube D, and bent tube K, M carrying the cross-piece O, are replaced by a pair of pivoted arms, one of which is connected to a wall plate or bracket by a pair of joints such as described above, while the other is connected by a similar pair of joints to a telescopic arm carrying the cross-piece.

4443. Siemens, W. Sept. 17. [Provisional protection only.]

Photometers.—Relates to a method of determining the energy from any radiating source, and expressing it in any unit of energy. A simple or compound prism or Rutherford's grating is

mounted adjustably in a frame, and behind is arranged, between two parallel surfaces, a series of cavities with reflecting surfaces. These cavities are arranged in a curve to ensure equal distribution of the rays. In each cavity is placed the black bulb of a thermometer, the stem of which projects through the casing so that its indications can be observed. The rays are distributed to the different cavities to act on the different thermometers according to their relative refrangibility, and the proportion of heat and light in the rays from any source is thus measured. Means may be taken to preserve a photographic record of the readings of the thermometers, and the latter may be replaced by thermopiles.

4471. Brown, R., Barnes, R. W., and Bell, J. Sept. 19.

Photo-mechanical printing.—Relates to modifications of the processes described in Specifications No. 2912, A.D. 1878, No. 3760, A.D. 1879, and No. 3476, A.D. 1883, for producing watermark effects on paper, or designs or pictures in relief on leather, metal foil, or the like. Instead of using gelatine for the printing-surface, or a soft metal surface cast from the gelatine surface, a photo-etched steel or other hard metal plate is used. The plate is coated with bitumen or its equivalent, exposed under the positive or negative as required, developed as usual, etched, and then cleaned. For half-tone pictures, a grained, lined, or hatched surface is obtained as described in Specification No. 1380, A.D. 1883. The material to be pressed is passed with the steel plate between hard steel rollers; or the metal sheet may be fixed to one of the rollers so that the paper, leather, metal foil, or the like can be passed rapidly through, either in single sheets, or from the web or roll. Or impressions may be made by means of a screw press.

4557. Brewer, E. G., [Geesbergen, J., and Soc. Geruzet frères]. Sept. 24. [*Provisional protection only.*]

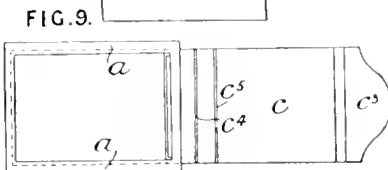
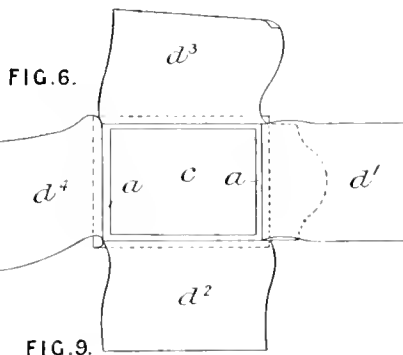
Re-touching.—Comprises an electrical re touching apparatus, in which the pencil is held in a spring carrier oscillated by the vibration of the armature of an electromagnet, so that when the pencil point is brought lightly upon the part that requires retouching, it gives a dotting effect regularly and rapidly. The pencil may be arranged to give strokes instead of dots.

4705. Brown, R., Barnes, R. W., and Bell, J. Oct. 3.

Photo-mechanical printing; producing photographs of special character.—In the production of grained or stippled printing surfaces for typographic or lithographic printing, a clean photographic transparency is obtained and placed upon a lined, grained, or hatched background. The

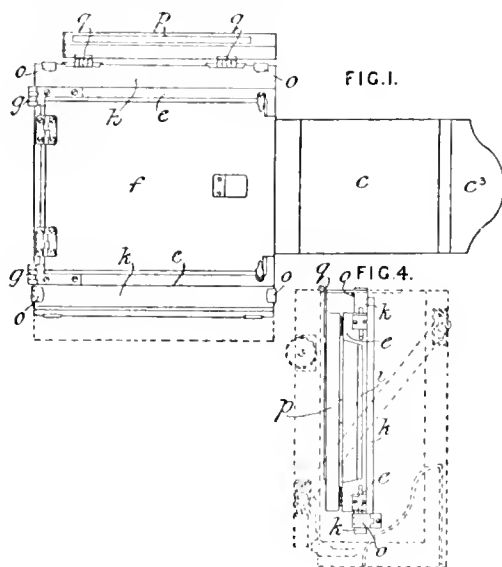
background may be varied to suit the subject, part lined and part stippled, for example. This combination is then photographed, and the result used as usual for the production of printing-surfaces. The grained photograph may be produced immediately by covering the sensitive plate in the camera by a network or a suitable transparency, the exposure taking place through such medium. A typographic block may be produced by coating a zinc or other metal surface with bitumen or other sensitive substance, and placing a transparency of grains, lines, &c., and a transparency of the picture, over the sensitized zinc, the printing being effected by light in the usual way. The plate is developed and etched as usual.

4732. Atkinson, J. E. Oct. 4.



Dark slides; cameras.—Relates to envelopes, each carrying preferably one sensitive plate or film, and each having a slide by which the plate or film may be exposed; and to a camera back to accommodate such envelopes. The envelope consists of a rectangular frame *a*, Fig. 6, of wood, cardboard, papier-mâché or other light and cheap material, into which the plate or film fits. The front has an opening rather smaller than the plate it contains, and over this there is a sliding shutter *c* of suitable material, scored or creased at *c*¹, *c*² so that it may be bent back out of the way when drawn out; the projecting piece or handle part *c*³ can also be bent back when the shutter is pushed in. The sides of the back of the envelope have light-tight flaps *d*¹, *d*², *d*³, *d*⁴, constructed for example of an india rubber coated fabric; and by simply turning these flaps over the plate after it has been introduced, it is safely protected from light. The back *e* of the camera, Figs. 1 and 4, is hinged to the body so that it may be turned aside to adjust the focussing-screen *p*. The outer side of the back has a door *f* through which the envelopes containing their plates are introduced, one at a time, as

required. There is a slot *i* or other provision to allow of the drawing out of the slide that protects the face of the plate, in the usual way. The hinges *q* of the focussing-screen slide outwards, so



that the screen may lie outside the back when the camera is shut as shown in Fig. 4. The back *e* may be hinged at *g* to a frame *k* which is rabbeted to fit in the body of the camera and is held in place by clasps *o*. The detachable frame *k* may be placed side uppermost to bring the back into any desired position.

4735. Woodbury, W. B. Oct. 5. [*Provisional protection only.*]

Photo-mechanical printing.—In producing printing-surfaces from half-tone subjects, for the production of the necessary grain, line effect, &c., negatives or positives are obtained of such objects as fine ruled lines, netting, gauze, dots, or a print from a grained stone. Carbon transparencies are made from these, and transferred, as required, to the negative or positive of the subject. Or a photo-lithographic transfer may be used, and if not dense enough, an opaque powder may be dusted on. A grained negative or positive may be made by exposing under the negative or positive a glass plate coated with gelatine or albumen, grape sugar, and bichromate of potash, and then dusting on a suitable granular powder. Or the negative or positive itself may be coated with the same mixture and treated in the same way as the plain glass. Or a relief by the Woodbury process may be made from the negative or positive combined with the grained or lined carbon transparency. This relief is pressed against enamelled or glazed cardboard, and the reverse relief is inked for transfer to zinc for etching, or to stone for lithographic printing. Or a Woodbury gelatine relief on glass may be warmed, coated with wax or

its equivalent, and squeezed against glass to get a level surface. The glass is removed, and a fine flexible and elastic V-shaped tool is caused to eat lines in two directions, the depth of the grooves being regulated by the relief under the wax. An electrotpe copy of this surface is printed from.

5154. Brown, J. Oct. 30. [*Provisional protection only.*]

Photo-mechanical printing; copying drawings and the like.—Relates to the preparation of raised designs on metal surfaces from drawings, prints, &c. An engraved plate is first made from the original print &c. by any suitable means, and an impression is taken in a bituminous, asphaltum, or resinous acid-resisting varnish; this print is transferred by pressure to the surface on which the design is required. The edges and other parts of the plate not forming the design are protected by wax or the like, and the transferred impression may be sprinkled with bituminous powder if necessary. The surface is then etched by means of acid &c. or an electric battery. The design may be produced on cylindrical surfaces, and may be repeated as required. The plates thus prepared may be used for pottery, calico, and other printing, stamping, engraving, mosaic work in enamels, and other purposes.

5204. Garside, H. Nov. 2.

Photo-mechanical printing; negatives for photo-mechanical printing, producing.—Relates to means for producing surfaces for mechanical printing, in which the light and shade effects are represented by dots or lines. A metal or other plate is formed with shallow conical recesses close together over its surface, and a print from this is taken by the Woodburytype method on glass or thin paper, enough pigment being used to get opacity at the centre of each spot. This transparency is copied photographically to the required size, and films or screens are prepared from the copy. A photo-lithographic transfer is then made, from which printing-surfaces may be produced by various methods. For producing a raised surface, a positive is used instead of a negative. Shaded lines, and two or more films of them, may be used instead of the dots for copying machinery, statuary, and coins. Or the grain may be obtained as follows:—An exposed collographic plate is inked and a grained resist transferred to a metal plate; or a similar transfer may be made by means of the grained paper used by lithographic artists, or in other ways. The conical grain is then produced by repeated etchings. A negative may be obtained with a grain by exposing it behind a grained screen, or by exposing the plate under the grained screen before or after the exposure on the subject. A piece of carbon tissue may be exposed under the negative, and, after development, supported on a surface of soluble gelatine; while still soft, it is pressed on a metal plate having a V-shaped grain so that the grain is filled with the thickest portion of the relief. The soluble support is dissolved

away, and a printing-plate is produced by electro-deposition. Instead of using the soluble gelatine support, undeveloped tissue may be pressed on the plates, and there developed. Or a piece of carbon tissue may be exposed, developed, transferred to a white surface thickly coated with colourless gelatine or the like, and, while still soft, pressed against a hard grained plate. The picture, when dry, is removed, and a negative is made from it to furnish a printing-surface. The screen of shaded dots or lines may be replaced by a mask of transparent dots or lines on an opaque ground, by placing the mask at some distance from the negative during printing so that the light disperses before it reaches the negative.

5224. Sachs, J. J. Nov. 10.

Photo-mechanical printing; negatives for photo-mechanical printing, producing; ornamenting by photography.—Relates to the production of printing or embossing surfaces from drawings, paintings, photographs, &c. or of ornamental surfaces. A hard surface is submitted to sand or like blast, is covered with ink or the like, and is used to obtain a typographical impression on a transparent medium such as that described in Specification No. 3948, A.D. 1883, thus obtaining a grained screen which is used with the photograph to be copied in printing upon a sensitized surface. This surface is treated and etched by processes such as that described in Specification No. 266, A.D. 1881, [*Abridgment Class Printing other than letterpress &c.*], and is used as a printing or embossing surface. The sand-blasted surface may be used, either directly or by means of a transfer, for printing upon the negative or positive, or on the photograph, drawing, &c. The sand blast may be used to give a colour-holding surface to the depressions of a photo-etched design before finally cleaning off the resist.

5464. Kepler, A., Premion, A. M. de, and Pigeau, A. Nov. 20. [*Provisional protection only.*]

Colouring.—The positive to be treated is rendered transparent by being placed in a bath, containing equal parts of clarified resin and essence or spirits of turpentine maintained at a temperature of 90° C., for three hours, after which it is allowed to cool. The mixture is then melted and the print is withdrawn, and drained in a warm trough. It is then washed with benzene. When dry it is coloured on the back with artist's colours, and mounted on a suitable surface, and subjected to pressure.

5681. Lake, W. R., [Bisson, A.] Dec. 8.

Colouring; mounting prints; finishing.—Relates to making prints transparent, colouring transparent prints or prints transferred on to glass, talc, &c., lithographically or by hand, and mounting the coloured prints. The print obtained upon a

translucent support such as mica, vegetable parchment, dioptric paper, transparent mineral paper, and paper mounted on cloth or the like, is made transparent by a cold solution of resin in benzene and linseed oil. For colouring, pieces of cardboard or thin metal are cut out from tracings so that each represents one colour or shade. One stone for each colour is coated with a sensitive layer of chromated albumen or gum, exposed under the pattern, and washed in the ordinary manner. Each stone then prints its colour directly upon the front or upon the back of the film as required. Instead of printing, the print may be backed with transparent paper, and the colours applied in flat tints with short brushes by means of the cut out patterns as in stencilling operations. The ground tone is produced by sticking a tinted paper to the back. The prints are kept under pressure after mounting. Copies of pictures may be mounted on or between cloths, pressed, and varnished, to imitate an oil painting on canvas.

5896. Borland, A. Dec. 28. [*Provisional protection only.*]

Negatives for photo-mechanical printing, producing.—A negative for a printing-surface is produced from a print or from an object by placing a screen in front of the sensitized plate, either touching it or at a distance. The screen may consist of wire or hair gauze, of perforated metal, paper, &c., or of a fabric such as muslin net or crape. A reverse texture may be obtained by exposing a plate with a screen in front of it to light and using the negative so produced as a screen.

5915. Warren, W. H. Dec. 29.

Chromo-gelatine processes; printing; ornamenting by photography.—Relates to a method of producing designs on glass by means of an exposed and developed sensitive layer. The surface to receive the design is coated with a mixture containing asphaltum, bichromate of potash, lampblack, turpentine, alcohol, tartaric acid, and varnish, the preparation of which mixture comprises three distinct stages. The coated surface is exposed under an etched glass, the etched design or parts being made opaque, or under any opaque design on a transparent ground. After exposure, the surface remains some half hour in a darkened room, and is then brushed over lightly with turpentine, benzene, kerosine or coal oil, together or combined, or its equivalent, to remove the parts not acted on by light. It is next washed clean with soapy water and dried; it is retouched if necessary. It may lastly be painted, silvered, gilt, or etched.

5947. Rydill, G. Dec. 31. *Drawings to Specification.*

Producing transparencies; colouring; ornamenting by photography.—Relates to the preparation of

photographs for producing transparent or translucent photographs to be used for imitating stained glass or for other ornamental purposes. Photographs, drawings, &c. may be rendered translucent by treatment with oil under pressure in a closed vessel, the excess of fat being removed by a hydro-extractor or by rollers. The photographs &c. may then be printed on the back in oil, water, or other colours to bring up the coloured features of a person, landscape, &c. A part of the printing may be done on the back of the photograph and the rest on a separate paper fixed to a glass behind the photograph. A sheet of glass is placed at the front of the photograph, and another picture may be placed behind the second glass which is covered by a third glass the three sheets of glass being cemented together. Or the printed photograph may be fixed, by copal varnish, on the inside of a glass shade or vase, or to the back of a looking-glass. Or a photograph of a landscape &c. may be printed on the back with appropriate colours in water colours or in oil colours mixed with pine oil dissolved in alcohol &c. Two similar photographic negatives may be used to print on both sides of

photographic paper sensitized on both sides, the photograph being finished in colour as desired. A transparent photograph may be covered on the back with gold leaf, or with coloured paper cut out to represent features, dress, &c., or any design. Any other picture is then placed at the back, the two being enclosed between two sheets of glass cemented at their edges. Or the photograph &c., previously steeped in water, may be pressed upon a varnished sheet of glass, or a vase or glass shade, and, when dried, varnished on the back with pine oil and varnish. Or the paper mount of the photograph may be rubbed away with a sponge &c. and the print then varnished and backed with a sheet of translucent paper and glass; a sheet of opal glass may replace the paper. In the production of a composite photograph, a photographic print in made of a view or landscape, upon which is pasted the cut-out figure of a person. Photographic copies may then be prepared and coloured, and rendered translucent if desired. The coloured photographs may be applied to the ornamentation of looking-glasses, chimney-pieces, and panels, and for other ornamental purposes.

LONDON:

PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1903,

PATENT OFFICE PUBLICATIONS.

ACTS AND RULES.

Patents, Designs, and Trade Marks Act, 1833. 1s. 7½d., by post 1s. 9d.
 Patents, Designs, and Trade Marks (Amendment) Act, 1835. 1½d., by post 2d.
 Patents Act, 1836. 1½d., by post 2d.
 Patents, Designs, and Trade Marks Act, 1838. 1½d., by post 2d.
 Patents Act, 1901. ½d., by post 1d.
 Patents Act, 1902. ½d., by post 1d.
 Patents Rules, 1903. 6d., by post 7d.
 Designs Rules, 1890. 6d., by post 6½d.
 Designs Rules (Lace), 1893. 1d., by post 1½d.
 Designs Rules, 1898. 1d., by post 1½d.
 Trade Marks Rules, 1890. 6d., by post 7d.
 Trade Marks Rules, 1897. 1d., by post 1½d.
 Trade Marks Rules, 1898. 1d., by post 1½d.
 Register of Patent Agents' Rules, 1889 and 1891. 2d., by post 2½d.

JOURNALS.

ILLUSTRATED OFFICIAL JOURNAL (PATENTS).

Published every Wednesday. 6d., by post 8d.
 Annual Subscription, including postage, 1l. 15s.;
 Quarterly Subscription, 8s. 9d. CONTENTS:—
 Official Notices—Applications for Patents—
 Acceptances of Specifications—Amendments of
 Specifications—Patents Sealed—Renewal Fees
 Paid—Patents Void—Applications Abandoned &c.
 —Specifications &c. Published—Designs Regis-
 tered—Illustrated Abridgments of Current
 Specifications—and Reports of Patent &c. Cases.

1884. Vols. I. and II. 3l. 3s.
 1885-1887. Vols. III.-VIII. 1l. 6s. each.
 1888-1903. Vols. IX.-XXIII. 1l. 6s. each.

TRADE MARKS JOURNAL. Published every
 Wednesday. 6d., by post, 8d. Annual Subscrip-
 tion, including postage, 1l. 15s. Quarterly Sub-
 scription, 8s. 9d. CONTENTS:—Illustrations of
 Trade Marks applied for, and the Name and
 Calling of Applicants.

1876-1887. Nos. 1 to 509. 1s. each.
 1888. Nos. 510 to 561. 1s. 6d. each.
 1889-1903. Nos. 562 to 1344. 6d. each, by post 8d.

Subscriptions to the above Journals will not be
 received for a shorter period than three months,
 such period to commence on either of the follow-
 ing dates:—

1st January,	1st July, or
1st April,	1st October.

Annual Subscriptions to date from 1st January in
 each year.

141,000 Wt 15954 11/03 D & S 2 15921

REPORTS of PATENT, DESIGN, and TRADE MARK CASES.

1884-6. 6d. each number, or 10s. per yearly volume.
 1887-8. 1s. each number, or 20s. per yearly volume.
 1889-1903. 6d. each number. Price of yearly
 volumes according to size.

DIGESTS of CASES reported in Vols. I.-V., 1s. each;
 Vols. VI.-XVII., 6d. each.

CONSOLIDATED DIGEST of CASES reported in
 Vols. I.-X., 5s. per copy, by post 5s. 5d.;
 Vols. XI.-XVI., 5s. per copy, by post 5s. 4d.

PRINTED SPECIFICATIONS OF PATENTS. 1617-1903.

Price per copy, 8d., including inland postage. In
 ordering Specifications the Name of the Patentee, and
 the Number and Year of the Patent must be given.
 Specifications are on sale 15 days after advertisement
 of Acceptance of Complete Specification.

ABRIDGMENT-CLASS AND INDEX KEY (issued December, 1899).

Showing ABRIDGMENT CLASSES and INDEX HEAD-
 INGS, to which Inventions are assigned in the
 Official Publications of the Patent Office. 1s., by
 post 1s. 6d.

ABRIDGMENTS OF SPECIFICA- TIONS.

(A).—*Illustrated* volumes of Abridgments of Specifi-
 cations in accordance with the classification in
 the ABRIDGMENT-CLASS AND INDEX KEY have
 been published, or are in course of preparation,
 for eight consecutive periods, dealing completely
 with all specifications published from 1855 to the
 present date. There are 146 volumes for each of
 these eight periods, and the price of each volume
 is 1s., including inland postage.

List of Illustrated Volumes.

1. ACIDS, ALKALIES, OXIDES, AND SALTS, INORGANIC.
2. ACIDS AND SALTS, ORGANIC, AND OTHER CARBON
 COMPOUNDS, (including Dyes).
3. ADVERTISING AND DISPLAYING.
4. AERONAUTICS.
5. AGRICULTURAL APPLIANCES, FARMYARD AND LIKE,
 (including the housing, feeding, and treatment of
 animals).
6. AGRICULTURAL APPLIANCES FOR THE TREATMENT OF
 LAND AND CROPS, (including Gardening-appliances).

7. AIR AND GAS ENGINES.
8. AIR AND GASES, COMPRESSING, EXHAUSTING, MOVING, AND OTHERWISE TREATING.
9. AMMUNITION, TORPEDOES, EXPLOSIVES, AND PYRO-TECHNICS.
10. ANIMAL-POWER ENGINES AND MISCELLANEOUS MOTORS.
11. ARTISTS' INSTRUMENTS AND MATERIALS.
12. BEARINGS AND LUBRICATING-APPARATUS.
13. BELLS, CONGS, FOHORNNS, SIRENS, AND WHISTLES.
14. BEVERAGES, [excepting Tea, coffee, cocoa, and like beverages].
15. BLEACHING, DYEING, AND WASHING TEXTILE MATERIALS, YARNS, FABRICS, AND THE LIKE, [excepting Dyes].
16. BOOKS, [including Cards and card cases and the like].
17. BOOTS AND SHOES.
18. BOXES AND CASES, [excepting Trunks, portmanteaus, hand and like travelling bags, baskets, hampers, and other wickerwork].
19. BRUSHING AND SWEEPING.
20. BUILDINGS AND STRUCTURES.
21. CASES AND BARRELS.
22. CEMENTS AND LIKE COMPOSITIONS.
23. CENTRIFUGAL DRYING, SEPARATING, AND MIXING MACHINES AND APPARATUS.
24. CHAINS, CHAIN CALLES, SHACKLES, AND SWIVELS.
25. CHIMNEYS AND FLUES, [including Ventilating-shaft tops].
26. CLOSETES, URINALS, BATHS, LAVATORIES, AND LIKE SANITARY APPLIANCES.
27. COIN-FREED APPARATUS AND THE LIKE.
28. COOKING AND KITCHEN APPLIANCES, BREAD-MAKING, AND CONFECTIONERY.
29. COOLING AND ICE-MAKING, [including Refrigerators and Ice-storing].
30. CUTLERY.
31. CUTTING, PUNCHING, AND PERFORATING PAPER, LEATHER, AND FABRICS, [including the general treatment of paper after its manufacture].
32. DISTILLING, CONCENTRATING, EVAPORATING, AND CONDENSING LIQUIDS, [excepting Steam-engine condensers].
33. DRAINS AND SEWERS.
34. DRYING.
35. DYNAMO-ELECTRIC GENERATORS AND MOTORS, [including Frictional and influence machines, magnets, and the like].
36. ELECTRICITY, CONDUCTING AND INSULATING.
37. ELECTRICITY, MEASURING AND TESTING.
38. ELECTRICITY, REGULATING AND DISTRIBUTING.
39. ELECTRIC LAMPS AND FURNACES.
40. ELECTRIC TELEGRAPHS AND TELEPHONES.
41. ELECTROLYSIS, [including Electrodeposition and Electroplating].
42. FABRICS, DRESSING AND FINISHING WOVEN AND MANUFACTURING FELTED, [including Folding, Wind-ing, Measuring, and Packing].
43. FASTENINGS, DRESS, [including Jewellery].
44. FASTENINGS, LOCK, LATCH, BOLT, AND OTHER, [in-cluding Safes and strong-rooms].
45. FENCING, TRELLIS, AND WIRE NETTING.
46. FILTERING AND OTHERWISE PURIFYING LIQUIDS.
47. FIRE, EXTINCTION AND PREVENTION OF.
48. FISH AND FISHING.
49. FOOD PREPARATIONS AND FOOD-PRESERVING.
50. FUEL, MANUFACTURE OF.
51. FURNACES AND KILNS, [including Blowpipes and blow-pipe burners; Smiths' forges and rivet hearths; and Smoke and fumes, Treating].
52. FURNITURE AND UPHOLSTERY.
53. GALVANIC BATTERIES.
54. GAS DISTRIBUTION.
55. GAS MANUFACTURE.
56. GLASS.
57. GOVERNORS, SPEED-REGULATING, FOR ENGINES AND MACHINERY.
58. GRAIN AND SEEDS, TREATING, [including Flour and meal].
59. GRINDING, CRUSHING, PULVERIZING, AND THE LIKE.
60. GRINDING OR ABRADING, AND BURNISHING.
61. HAND TOOLS AND BENCHES FOR THE USE OF METAL, WOOD, AND STONE WORKERS.
62. HARNESS AND SADDLERY.
63. HATS AND OTHER HEAD COVERINGS.
64. HEATING, [excepting Furnaces and kilns; and Stoves, ranges, and fireplaces].
65. HINGES, HINGE-JOINTS, AND DOOR AND GATE FUR-NITURE AND ACCESSORIES, [excepting Fastenings, Lock, latch, bolt, and other].
66. HOLLOW-WARE, [including Buckets, Pans, Kettles, Saucepans, and Water-cans].
67. HORSE SHOES.
68. HYDRAULIC ENGINEERING.
69. HYDRAULIC MACHINERY AND APPARATUS, [excepting Pumps and other means for raising and forcing liquids].
70. INDIA-RUBBER AND GUTTA-PERCHA, [including Plastic compositions and Materials of constructive utility, other than metals and stone].
71. INJECTORS AND EJECTORS.
72. IRON AND STEEL MANUFACTURE.
73. LABELS, BADGES, COINS, TOKENS, AND TICKETS.
74. LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING.
75. LAMPS, CANDLESTICKS, GASALIERES, AND OTHER ILLU-MINATING-APPARATUS, [excepting Electric lamps].
76. LEATHER, [including Treatment of hides and skins].
77. LIFE-SAVING, [MARINE], AND SWIMMING AND BATHING APPLIANCES.
78. LIFTING, HAULING, AND LOADING, [including Lowering, Winding, and Unloading].
79. LOCOMOTIVES AND MOTOR VEHICLES FOR ROAD AND RAIL, [including Portable and semi-portable engines].
80. MECHANISM AND MILL GEARING.
81. MEDICINE, SURGERY, AND DENTISTRY.
82. METALS AND ALLOYS, [excepting Iron and Steel manufacture].
83. METALS, CUTTING AND WORKING.
84. MILKING, CHURNING, AND CHEESE-MAKING.
85. MINING, QUARRYING, TUNNELLING, AND WELL-SINKING.
86. MIXING AND AGITATING MACHINES AND APPLIANCES, [excepting Centrifugal machine- and apparatus].
7. MOULDING PLASTIC AND POWDERED SUBSTANCES, [including Bricks, building and paving blocks, and tiles, and Pottery].
88. MUSIC AND MUSICAL INSTRUMENTS.
89. NAILS, RIVETS, BOLTS AND NUTS, SCREWS, AND LIKE FASTENINGS.
90. NON-METALLIC ELEMENTS.
91. OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS.
92. ORDNANCE AND MACHINE GUNS.
93. ORNAMENTS.
94. PACKING AND BALING GOODS.
95. PAINTS, COLOURS, AND VARNISHES.
96. PAPER, PASTEBOARD, AND PAPER MACHE.
97. PHILOSOPHICAL INSTRUMENTS, [including Optical, Nautical, Surveying, Mathematical, and Meteorological Instruments].
98. PHOTOGRAPHY.
99. PIPES, TUBES, AND HOSE.
100. PRINTING, LETTERPRESS AND LITHOGRAPHIC.
101. PRINTING OTHER THAN LETTERPRESS OR LITHO-GRAPHIC.
102. PUMPS AND OTHER MEANS FOR RAISING AND FORCING LIQUIDS, [excepting Rotary Pumps].
103. RAILWAY AND TRAMWAY VEHICLES.
104. RAILWAYS AND TRAMWAYS.
105. RAILWAY SIGNALS AND COMMUNICATING-APPARATUS.
106. REGISTERING, INDICATING, MEASURING, AND CALCULATING, [excepting signalling and indicating by signals].
107. ROADS AND WAYS.
108. ROAD VEHICLES.
109. ROPES AND CORDS.
110. ROTARY ENGINES, PUMPS, BLOWERS, EXHAUSTERS, AND METERS.
111. SEWAGE, TREATMENT OF, [including Manure].
112. SEWING AND EMBROIDING.
113. SHIPS, BOATS, AND RAFTS, DIV. I.
114. ————— DIV. II.
115. ————— DIV. III.
116. SHOP, PUBLICHOUSE, AND WAREHOUSE FITTINGS AND ACCESSORIES.
117. SIFTING AND SEPARATING.
118. SIGNALING AND INDICATING BY SIGNALS, [excepting Railway signals and communicating-apparatus].
119. SMALL-ARMS.
120. SPINNING, [including the preparation of fibrous materials and the doubling of yarns and threads].
121. STARCH, GUM, SIZE, GLUE, AND OTHER STIFFENING AND ADHESIVE MATERIALS.
122. STEAM ENGINES, [including Details common to fluid-pressure engines generally].
123. STEAM GENERATORS, [excepting Furnaces].
124. STONE, MARBLE, AND THE LIKE, CUTTING AND WORKING.
125. STOPPERING AND BOTTLING, [including Bottles, jars and like vessels].
126. STOVES, RANGES, AND FIREPLACES.
127. SUGAR.
128. TABLE ARTICLES AND APPLIANCES.
129. TEA, COFFEE, COCOA, AND LIKE BEVERAGES.
130. TOBACCO.
131. TOILET AND HAIRDRESSING ARTICLES, AND PER-FUMERY.
132. TOYS, GAMES, AND EXERCISES.
133. TRUNKS, PORTMANTEAUS, HAND AND LIKE TRAVEL-ING BAGS, BASKETS, HAMPERS, AND OTHER WICKER-WORK.
134. UMBRELLAS, PARASOLS, AND WALKING-STICKS.
135. VALVES AND COCKS.
136. VELOCIPEDES.
137. VENTILATION.

138. WASHING AND CLEANING CLOTHES, DOMESTIC ARTICLES, AND BUILDINGS.
 139. WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.
 140. WATERPROOF AND SIMILAR FABRICS.
 141. WEAVING-APPAREL.
 142. WEAVING AND WOVEN FABRICS.
 143. WEIGHING-APPARATUS.
 144. WHEELS FOR VEHICLES. [*excepting* Wheels for Locomotives and tramway and traction engines; Railway and tramway vehicles; and Toys].
 145. WOOD AND WOOD-WORKING MACHINERY.
 146. WRITING-INSTRUMENTS AND STATIONERY AND WRITING ACCESSORIES, [*including* Educational appliances].

List of Periods.

- 1855 - 1866. (*In course of Publication.*)
 1867 - 1876.
 1877 - 1883.
 1884 - 1888.
 1889 - 1892.
 1893 - 1896.
 1897 - 1900.
 1901 - 1904. (*In Preparation.*)

NOTICE.—*Volumes in course of publication can be obtained sheet by sheet, as printed, by payment in advance of a subscription of 2s. for each volume, including inland postage. The sheets already printed can be seen in the Patent Office Library and in some of the principal provincial Libraries.*

- (B).—*Unillustrated volumes of Abridgments of Specifications from 1617 to 1866. For the period before 1855, and for the period 1855 to 1866 until the publication of the illustrated series is completed, reference may be made to the unillustrated series of abridgments, but it must be borne in mind that this series is not in accordance with the above classification and does not deal completely with all the published specifications belonging to those periods. The price of each volume in this series is 2s., including inland postage.*

List of Unillustrated Volumes.

(*The numbers within brackets following the titles are the serial numbers of the volumes.*)

- ACIDS, ALKALIES, OXIDES, AND SALTS:—(40.) 1622-1866.
 AERONAUTICS. (41.) 1815-1866.
 AGRICULTURE:—
 ——— DIV. I.—FIELD IMPLEMENTS. (81.) 1618-1866.
 ——— DIV. II.—BARN AND FARMYARD IMPLEMENTS, [*including* the cleansing, drying, and storing of grain]. (82.) 1636-1866.
 ——— DIV. III.—AGRICULTURAL AND TRACTION ENGINES. (83.) 1618-1866.
 AIDS TO LOCOMOTION. (7.) 1691-1856.
 AIR, GAS, AND OTHER MOTIVE-POWER ENGINES. (62.) 1635-1866.
 ANCHORS. (69.) 1796-1866.
 ARTIFICIAL LEATHER, FLOORCLOTH, OILCLOTH, OIL-SEIN, AND OTHER WATERPROOF FABRICS. (80.) 1627-1866.
 ARTISTS' INSTRUMENTS AND MATERIALS. (54.) 1618-1866.
 BLEACHING, DYEING, AND PRINTING CALICO AND OTHER FABRICS AND YARNS. (41.) 1617-1857. 1858-1866.
 BREWING, WINE-MAKING, AND DISTILLING ALCOHOLIC LIQUIDS. (99.) 1634-1866.
 BRICKS AND TILES. (22.) 1619-1860. 1861-1866.
 BRIDGES, VIADUCTS, AND AQUEDUCTS. (36.) 1750-1866.
 BOOKS, PORTFOLIOS, CARD-CASES, &c. (43.) 1708-1866.

- BRUSHING AND SWEEPING. (57.) 1692-1866.
 CARRIAGES AND OTHER VEHICLES FOR COMMON ROADS. (98.) 1625-1866.
 CARRIAGES AND OTHER VEHICLES FOR RAILWAYS. (46.) 1807-1866.
 CASES AND BARRELS. (74.) 1797-1866.
 CHAINS, CHAIN CABLES, &c. (90.) 1634-1866.
 COOKING, BREAD-MAKING, AND CONFECTIONERY. (61.) 1634-1866.
 CUTTING, FOLDING, AND ORNAMENTING PAPER. (12.) 1636-1866.
 DRAINS AND SEWERS. (1.) 1619-1866.
 DRESSING AND FINISHING WOVEN FABRICS, AND MANUFACTURING FELTED FABRICS. (91.) 1620-1866.
 ELECTRICITY AND MAGNETISM, THEIR GENERATION AND APPLICATIONS. (15.) 1766-1857. 1858-1866.
 ELECTRICITY AND MAGNETISM:—
 ——— DIV. IV.—ELECTRIC LIGHTING, IGNITING, AND HEATING. (95.) 1839-1876.
 ——— DIV. V.—ELECTRODEPOSITION AND ELECTROLYSIS. (96.) 1805-1876.
 ——— DIV. VI.—ELECTRIC MOTIVE-POWER ENGINES AND SIMILAR APPARATUS. (97.) 1837-1876.
 FARRIERY. (53.) 1719-1866.
 FIRE-ARMS AND OTHER WEAPONS, AMMUNITION, AND ACCOUTREMENTS. (10.) 1589-1858. 1858-1866.
 FIRE ENGINES, EXTINGUISHERS, ESCAPES, ALARMS, &c. (88.) 1625-1894.
 FURNITURE AND UPHOLSTERY. (39.) 1620-1866.
 GRINDING GRAIN, AND DRESSING FLOUR AND MEAL. (78.) 1623-1866.
 HARBOURS, DOCKS, CANALS, &c. (77.) 1617-1866.
 HINGES, HINGE-JOINTS, AND DOOR SPRINGS. (9.) 1755-1866.
 HYDRAULICS. (31.) 1617-1866.
 ICE-MAKING MACHINES, ICE SAFES, AND ICE HOUSES. (85.) 1819-1866.
 LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING. (29.) 1675-1866.
 LAMPS, CANDLESTICKS, CHANDELIERS, AND OTHER ILLUMINATING APPARATUS. (44.) 1637-1866.
 LETTERPRESS AND SIMILAR PRINTING. (13.) 1617-1857. 1858-1866.
 LOCKS, LATCHES, BOLTS, AND SIMILAR FASTENINGS. (60.) 1774-1866.
 MANUFACTURE OF IRON AND STEEL. (6.) 1620-1866.
 MANUFACTURE OF PAPER, PASTEBOARD, AND PAPIER-MÂCHÉ. (11.) 1665-1857. 1858-1866.
 MANURE. (3.) 1721-1855. 1856-1866.
 MARINE PROPULSION, [*excluding* Sails]. (5.) 1618-1857. 1857-1866.
 MASTS, SAILS, RIGGING, &c. (73.) 1625-1866.
 MEDICINE, SURGERY, AND DENTISTRY. (25.) 1620-1866.
 METALLIC PIPES AND TUBES. (70.) 1741-1866.
 METALS AND ALLOYS, [*excepting* Iron and Steel]. (18.) 1623-1859. 1860-1866.
 MILKING, CHURNING, AND CHEESE-MAKING. (72.) 1777-1866.
 MINING, QUARRYING, TUNNELLING, AND WELL-SINKING. (71.) 1618-1866.
 MUSIC AND MUSICAL INSTRUMENTS. (26.) 1634-1866.
 NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS. (58.) 1618-1866.
 NEEDLES AND PINS. (45.) 1753-1866.
 OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS. (27.) 1617-1866.
 OPTICAL, MATHEMATICAL, AND OTHER PHILOSOPHICAL INSTRUMENTS. (76.) 1636-1866.
 PAINTS, COLOURS, AND VARNISHES. (50.) 1618-1866.
 PHOTOGRAPHY. (19.) 1839-1859. 1860-1866.
 PLATING OR COATING METALS WITH METALS. (23.) 1637-1860. 1861-1866.
 POTTERY. (24.) 1626-1861. 1862-1866.
 PREPARATION AND COMBUSTION OF FUEL. (30.) 1620-1865 (*out of print*).
 PREPARATION AND USE OF TOBACCO. (42.) 1721-1866.
 PREPARATION OF INDIA-RUBBER AND GUTTA-PERCHA. (16.) 1791-1866.
 PREPARING AND CUTTING CORE, BOTTLING LIQUIDS, &c. (56.) 1777-1866.
 PRESERVATION OF FOOD. (4.) 1691-1855. 1856-1866.
 PRODUCTION AND APPLICATIONS OF GAS. (17.) 1681-1853. 1854-1866.
 PURIFYING AND FILTERING WATER. (79.) 1675-1866.
 RAILWAYS. (33.) 1803-1866.
 RAILWAY SIGNALS AND COMMUNICATING APPARATUS. (38.) 1840-1866 (*out of print*).
 RAISING, LOWERING, AND WEIGHING. (31.) 1617-1866.
 ROADS AND WAYS. (35.) 1619-1866.
 SADDLERY, HARNESS, STABLE FITTINGS, &c. (34.) 1625-1866.
 SAFES, STRONG ROOMS, TILLS, &c. (64.) 1811-1866.
 SEWING AND EMBROIDERING. (2.) 1755-1866.
 SHIP BUILDING, REPAIRING, SHEATHING, LAUNCHING, &c. (21.) 1618-1860. 1861-1866.
 SKINS, HIDES, AND LEATHER. (55.) 1627-1866.
 SPINNING. (28.) 1624-1863 (*out of print*). 1864-1866.
 STARCH, GUM, SIZE, GLUE, &c. (100.) 1717-1876.

STEAM CULTURE. (8.) 1618-1856. *See also* AGRICULTURE, DIVS. I. and III.
 STEAM ENGINES. (49.) 1618-1859 (in 2 vols.). 1860-1866. (in 2 vols.).
 STEERING AND MANŒUVRING VESSELS. (75.) 1763-1866.
 SUGAR. (48.) 1863-1866.
 TEA, COFFEE, CHICORY, CHOCOLATE, COCOA, &c. (87.) 1704-1866.
 TOYS, GAMES AND EXERCISES. (51.) 1672-1866.
 TRUNKS, PORTMANTEAUS, BOXES, AND BAGS. (84.) 1635-1866.
 UMBRELLAS, PARASOLS, AND WALKING-STICKS. (47.) 1786-1866.
 UNFERMENTED BEVERAGES, AERATED LIQUIDS, MINERAL WATERS, &c. (86.) 1774-1866.
 VENTILATION. (52.) 1632-1866.
 WASHING AND WRINGING MACHINES. (89.) 1691-1866.
 WATCHES, CLOCKS, AND OTHER TIMEKEEPERS. (9.) 1681-1866. 1857-1866.
 WATER CLOSETS, EARTH CLOSETS, URINALS, &c. (63.) 1775-1866.
 WEARING-APPAREL.—DIV. I.—HEAD COVERINGS. (65.) 1637-1866.
 ———— DIV. II.—BODY COVERINGS. (66.) 1671-1866.
 ———— DIV. III.—FOOT COVERINGS. (67.) 1693-1866.
 ———— DIV. IV.—DRESS FASTENINGS AND JEWELLERY. (68.) 1831-1866.
 WEAVING. (20.) 1620-1859. 1860-1866.
 WRITING INSTRUMENTS AND MATERIALS. (37.) 1635-1866.

INDEXES.

1617-1852.

NAME INDEX. 5s., by post 5s. 6d.

SUBJECT-MATTER INDEX. 2 vols. 10s., by post 10s. 10d.

1852-1883.

NAME INDEX.

1852-56, 1861-70. 2s. 6d. each yearly volume, by post 2s. 10d.

1871-1873. 2s. each yearly volume, by post 2s. 3d.

1857-63, 1874-83. *Out of print.*

SUBJECT-MATTER INDEX.

1852-1855. 5s. each yearly volume, by post 5s. 4d.

1856-1883. *Out of print.*

1884 and subsequent years.

NAME INDEX.

1884. *Out of print.*

1885-1888. 2s. each yearly volume, by post 2s. 4d. 1887 *out of print.*

1889-1902. *See* Illustrated Official Journals. Nos. 52, 108, 160, 212, 265, 317, 370, 423, 475, 527, 579, 631, 683, and 735, 6d. each, by post 8d. Journals Nos. 108, 160, and 212, *out of print.*

SUBJECT-MATTER INDEX of ACCEPTED COMPLETE SPECIFICATIONS DATED IN THE YEARS NAMED.

1881. 7s., by post 7s. 5d.

1885-1886. *Out of print.*

1887-1890. 3s. 4d. each yearly volume, by post 3s. 8d.

1891-1901. 2s. each yearly volume, by post 2s. 3d.

MONTHLY SUBJECT-MATTER INDEX of ACCEPTED COMPLETE SPECIFICATIONS.

Consolidated in March, June, September, and December, 1s. each part. Annual Subscription, 5s., by post 7s. 6d.

PATENT OFFICE LIBRARY.

CATALOGUE.

Vol. I. Authors. 1898. 1l. 6s. 0d.; by post, 1l. 6s. 8d.

Vol. II. Subjects. 1883. 15s. 8d.; by post, 16s. 2d.
(New edition in preparation.)

GUIDES.

6d. each, including inland postage.

1. Key to Classification of French Patent Specifications.
2. Photography. Subject List.
3. Laws of Industrial Property and Copyright. Subject List.
4. Guide to the Search Department of the Patent Office Library. *(Second Edition.)*
5. Key to the German Patent Classification (Austria; Denmark; Germany; Norway).
6. Chemistry and Chemical Technology. Subject List.
7. Chemical Industries, including Destructive Distillation, Mineral Oils and Waxes, Gaslighting, Acetylene; Oils, Fats, Soaps, Candles, and Perfumery; Paints, Varnishes, Gums, Resins; Paper and Leather Industries.
8. Class List and Index of the Periodical Publications in the Patent Office Library.
9. Domestic Economy, Foods, and Beverages; including the Culture of Cacao, Coffee, Barley, Hops, Sugar, Tea, and the Grape. Subject List.
10. Textile Industries and Wearing-apparel; including the Culture and Technology of Textile Fibres. Subject List.
11. General Science, Physics, Sound, Music, Light, Microscopy, and the Philosophical Instruments. Subject List.
12. Architecture and Building Construction. Subject List.
13. Mineral Industries, &c. Subject List.

NOTICE.—The above publications are sold at the PATENT OFFICE, 25, Southampton Buildings, Chancery Law, W.C., and will be forwarded by post on receipt of the price and of the postage when such is charged. All Subscriptions must be paid in advance. Sums amounting to 1s. or more must be remitted by Postal or Post Office Order, payable to the COMPTROLLER-GENERAL, at the above address. Cheques will not be accepted. Deposit accounts may be opened, the minimum deposit being £2.

